CDR Mini System FW-R7/17/21/22

Service
Service
Service

Service Manual

SERVICING

For servicing FW-R7, the set can be divided into two parts:

1. Except for the CD-R/W module the set has to be repaired on component level.
2. The **CD-R/W module** will be **exchanged completely** in case of a failure.
   The defective CD-R/W module has to be returned for central repair.

Available circuit descriptions:	*The Basics of Compact Disc Recordable/Rewritable*	**4822 725 25242**
	3rd generation Compact Disc Recording	**3104 125 40100**

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**CLASS 1
LASER PRODUCT**

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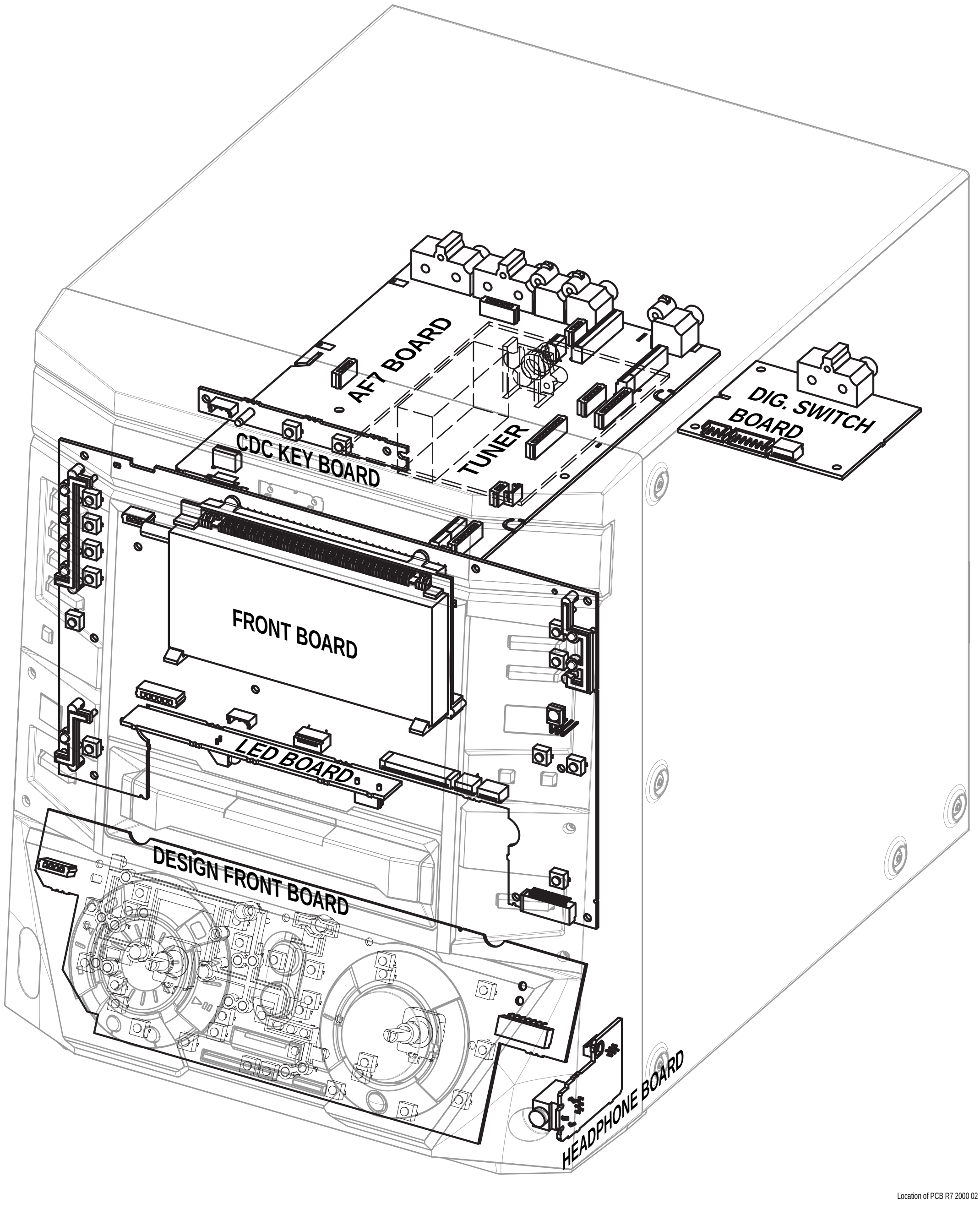
PHILIPS

Location of Printed Circuit Boards


AF7 BOARD
DIG. SWITCH BOARD
CDC KEY BOARD
TUNER
FRONT BOARD
LED BOARD
DESIGN FRONT BOARD
HEADPHONE BOARD

Location of PCB R7 2000 02 14

Technical Specification

General:

Mains voltage : 120 / 240V switchable (for /21)
: 230V (for /22)
: 120V (for /37)
Mains frequency : 50 ~ 60Hz
Power consumption : 76W at 1/8 P_{RATED}
: 175W at max output
: ≤15W at Stand by
: ≤2W at ECO Stand by

Tuner:

FM
Tuning range : 87.5MHz - 108MHz
Grid : 100kHz
IF : 10.7MHz
Aerial input : 75Ω
Sensitivity Mono : < 7µV (26dB S/N)
d (RF=1mV,Δf=75kHz) : 3% - typ. 2%
IF rejection : > 60dB
Image rejection : > 25dB
-3dB Limiting Point : < 23.5dBf

MW
Tuning range : 531kHz - 1062kHz
Grid : 9kHz
IF : 450kHz ±1kHz
Sensitivity at 26dB S/N : < 4.0mV/m
d (RF=50mV,m=80%) : < 5% - typ. 3%
IF rejection : > 45dB
Image rejection : > 28dB

Amplifier:

Output power : 2 x 50W at 6Ω
Headphone : 3.5mm stereo jack
Frequency response : 20Hz - 20kHz (-3dB) Limit
Equalizer : Digital Sound Control

Input sensitivity
Aux/Line : 500mV ±2dB

CDC unit:

Frequency response within : 20Hz - 20kHz at ±3dB
Signal/Noise ratio : > 94dB (A-weighted)
Distortion at 1kHz,0dB : -90dB
Channel unbalance : < 0.3dB
Channel crosstalk at 1kHz : -60dB
De-emphasis : 0 or 15/50 µS
Laser
Output power : ≤500µW
Wave length : 780nm ±20nm

CDR unit:

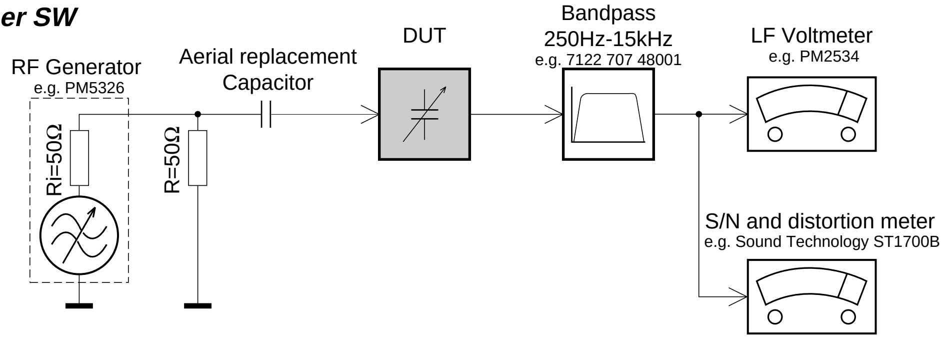
CD Playback:
Frequency response within : 20Hz - 20kHz at ±3dB
Signal/Noise ratio : > 90dB (A-weighted)
Distortion at 1kHz,0dB : -80dB
Channel unbalance : < 1dB
Channel crosstalk at 1kHz : -60dB
De-emphasis : 0 or 15/50 µS

Analog recording - digital playback:
Frequency response within : 20Hz - 20kHz at ±3dB
Signal/Noise ratio : > 84dB (A-weighted)
Distortion at 1kHz,0dB : -77dB
Channel unbalance : < 1dB
Channel crosstalk at 1kHz : -60dB
De-emphasis : 0 or 15/50 µS

Laser
Output power : ≤1mW during reading
: ≤20mW during writing
Laser class 3B
Wave length : 780nm ±20nm

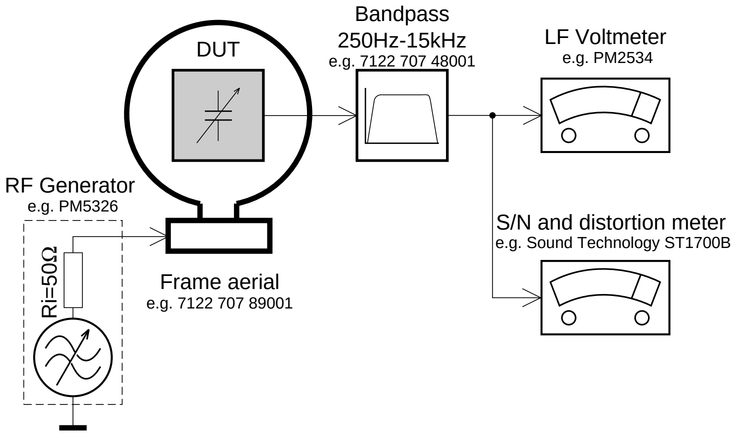
Measurement Setup

Tuner SW


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
Aerial replacement
Capacitor
RF Generator
e.g. PM5326
LF Voltmeter
e.g. PM2534
Ri=50Ω
R=50Ω
S/N and distortion meter
e.g. Sound Technology ST1700B

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

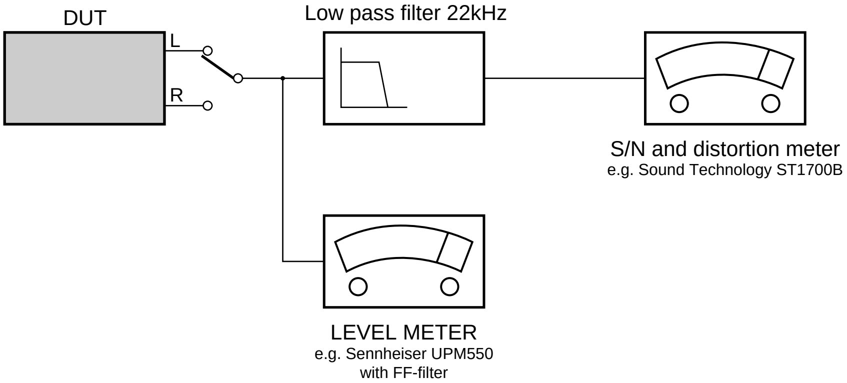
Tuner AM (MW,LW)


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
S/N and distortion meter
e.g. Sound Technology ST1700B
Ri=50Ω
Frame aerial
e.g. 7122 707 89001

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.

CD

Use Audio Signal Disc SBC429 4822 397 30184 (replaces test disc 3)
L.P.F. = 13 th order filter 4822 395 30204


DUT
L
R
Low pass filter 22kHz
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

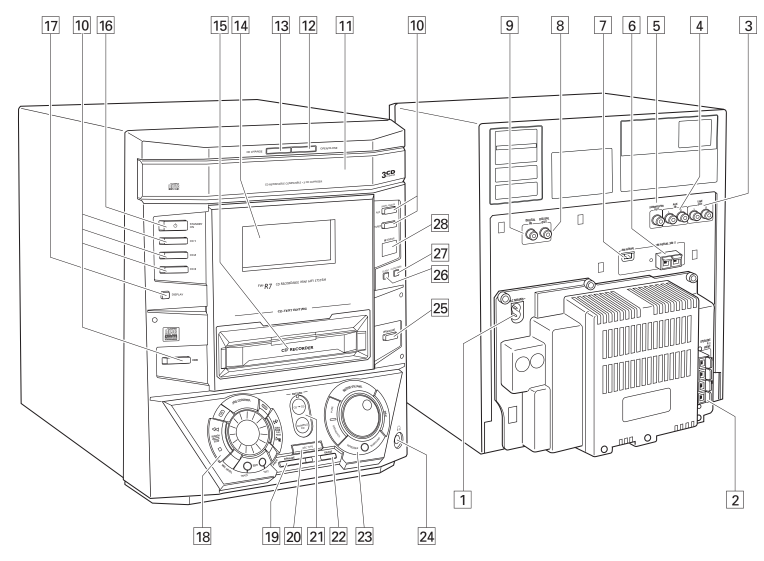
RC5 Codes

Remote control key	*System Code*	*Command Code*	*Remote control key*	*System Code*	*Command Code*
Standby	17,20, 21, 26	12	ALARM	16	89
CD1	20	55	SLEEP	16	38
CD2	20	56	BRIGHTNESS	16	71
CD3	20	57	REPEAT	20, 26	29
CDR	26	63	SHUFFLE	20, 26	28
Tuner	17	63	TRACK INCREMENT	26	114
Aux	21	63	VOLUME +	16	16
1(ABC)	17,20, 21, 26	01	VOLUME -	16	17
2 (DEF)	17,20, 21, 26	02	►	20, 26	53
3 (GHI)	17,20, 21, 26	03	❚❚	20, 26	48
4 (JKL)	17,20, 21, 26	04	❙◄	17,20, 21, 26	33
5 (MN)	17,20, 21, 26	05	►❙	17,20, 21, 26	32
6 (OPQ)	17,20, 21, 26	06	◄◄ **CD, CDR MODE**	20, 26	50
7 (RST)	17,20, 21, 26	07	◄◄ **AUX, TUNER MODE**	17, 21	31
8 (UVW)	17,20, 21, 26	08	►► **CD, CDR MODE**	20, 26	52
9 (XYZ)	17,20, 21, 26	09	►► **AUX, TUNER MODE**	17, 21	30
0 (Space)	17,20, 21, 26	00	■	20, 26	54
YES	17,20, 21, 26	87	INCREDIBLE SURROUND	16	64
NO	17,20, 21, 26	49	PURE	16	52
EDIT (TEXT)	17,20, 21, 26	82	LOUDNESS	16	50
PROGRAM	20, 26	36	BALANCE L	16	27
PROGRAM **TUNER MODE**	17	122	BALANCE R	16	26
MUTE	16	13			

Service Tools

TORX T10 screwdriver with shaftlength 150mm 4822 395 50423
TORX screwdriver set SBC 163 ....4822 295 50145

Audio signal disc SBC 429..4822 397 30184
Playability test disc SBC444 ....4822 397 30245
Test disc 5 (disc without errors) +
Test disc 5A (disc with dropout errors, black spots and fingerprints)
SBC 426/426A 4822 397 30096
Burn in test disc (65 min. 1kHz signal at -30dB level without "pause") ...4822 397 30155



On the back

1	**AC MAINS ~**	***After all other connections have been made***, connect the power cord to the power outlet. ***For optimal performance use only the original power cable.***
2	**SPEAKERS 6 Ω FRONT L/R**	connect to the supplied speakers
3	**LINE OUT L/R**	connect to the analog audio input of an additional appliance
4	**AUX IN L/R**	connect to the analog audio output of an additional appliance
5	**SUBWOOFER OUT**	connect to the input of a subwoofer
6	**FM AERIAL 300 Ω**	connect the supplied wire antenna here
7	**AM AERIAL**	connect the supplied loop antenna here
8	**DIGITAL OUT**	connect to the coaxial input of a digital appliance
9	**DIGITAL IN**	connect to the coaxial output of a digital appliance

On the front

10	**Source selection**	
	CD 1, CD 2, CD 3	selects the CD changer, switches to CD 1, CD 2 or CD 3
	CDR	selects the CD recorder
	TUNER	selects the tuner
	DIGITAL / ANALOG AUX	selects the input for an additional appliance
11		CD changer tray
12	**OPEN/CLOSE**	opens and closes the CD changer tray
13	**CD CHANGE**	selects the next disc tray
14		display
15	**CD RECORDER**	CD recorder tray
16	**⏻ STANDBY ON**	switches the unit on and to standby
17	**DISPLAY**	selects display information/text
18	**Multiple function control**	
	Rotary control:	
	JOG CONTROL	CDC, CDR: selects the previous/next track TUNER: selects the previous/next preset tuner station
	Keys to press:	
	YES	confirms a selection
	▷▷ SEARCH	CDC, CDR: searches forward, reviews the tracks in a program, controls the cursor in different menus TUNER: tunes to a higher radio frequency
	PLAY/PAUSE ▷II	starts and interrupts playback/recording
	PROG	opens/closes the program menu
	EDIT TEXT	enters/exits the text edit menu
	EDIT TRACK	enters/exits the track edit menu
	REC LEVEL	enables the rotary control to adjust the level for recordings
	STOP □	stops CD play/record, closes program memory
	◁◁ SEARCH	CDC, CDR: searches backward, reviews the tracks in a program, controls the cursor in different menus TUNER: tunes to a lower radio frequency
	NO	cancels a selection
19	**FINALIZE**	finalizes and unfinalizes recordings
20	**REC TYPE**	enters/exits the recording menu
21	**RECORD**	
	CD→CD	selects high speed recording and automatic finalizing of current CD
	COMPILE CD	selects high speed recording and automatic finalizing of current program
22	**ERASE**	erases recordings
23	**Sound control**	
	MASTER VOLUME	adjusts the volume
	DSC	**D**IGITAL **S**OUND **C**ONTROL selects sound characteristics
	INCREDIBLE SURROUND	creates an incredibly wide stereo effect
	LOUDNESS	boosts treble and bass
	PURE	switches DSC settings on/off
24	🎧	3.5 mm headphone jack
	Note: Connecting the headphones will switch off the speakers.	
25	**OPEN/CLOSE**	opens and closes the CD recorder tray
26	**CD TEXT**	switches through CD text information
27	**CLOCK/TIMER**	selects the clock function, activates and deactivates the timer
28	**iR SENSOR**	sensor for the infrared remote control

Note: You will recognize that various keys will be illuminated on the unit depending on the different modes or programs you are in. This is for your guidance in order to facilitate the finding of the relevant keys for selection.

Power

The type plate is located on the rear of the unit.

1 Check whether the power voltage as shown on the type plate corresponds to your local power voltage. If it does not, consult your dealer or service organization.

2 ***Make sure all connections have been made before switching on the power supply.***

3 Connect the supplied power cable to AC MAINS ~ and to the power outlet. This switches on the power supply.

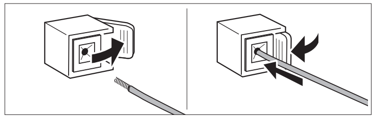
For optimal performance use only the original power cable.

When the unit is switched to standby, it is still consuming some power. To disconnect the unit from the power completely, remove the power cable from the power outlet.

To avoid overheating of the set, a safety circuit has been built in. Therefore, your unit may disconnect under extreme conditions. If this happens, switch the unit off and let it cool down before reusing it.

Speaker connections

The speaker connections are click-fit connectors. Use them as shown below.



1 Connect the colored (or marked) wire to the red terminal and the black (or unmarked) wire to the black terminal.

2 Connect:
- – Left speaker to L (red and black)
- – Right speaker to R (red and black)

Antenna connections

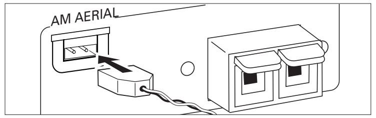
AM antenna

The supplied loop antenna is for indoor use only.

1 Fit the plug of the loop antenna to AM AERIAL as shown below.

2 Position the antenna as far as possible from a TV, VCR or other radiation sources.

3 Turn the antenna for optimum reception.



FM antenna

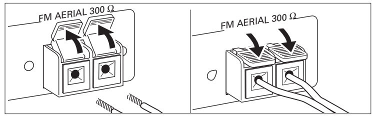
The supplied wire antenna can only be used to receive nearby stations. For better reception we recommend using a cable antenna system or an outdoor antenna.

1 Open the FM AERIAL 300 Ω click-fits by pushing the lever down as shown below.

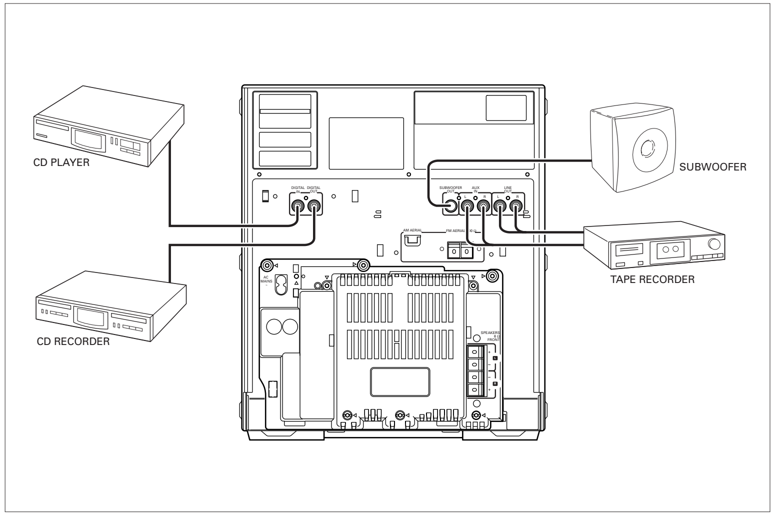
2 Insert each wire of the antenna into one hole.

3 Close the click-fits using the lever.

4 Move the antenna in different positions for optimum reception.



The unit complies with the FCC-Rules, Part 15 and with 21 CFR 1040.10. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.



Analog audio connections

AUX IN L/R

It is possible to use an additional appliance, e.g. tape recorder, TV or VCR, with the unit.

1 Insert the red plug of a cinch cable to the red jack AUX IN R and insert the white plug to the white jack AUX IN L.

2 Connect the other end of the cinch cable to the audio outputs of the additional appliance.

3 Press DIGITAL / ANALOG AUX repeatedly to select the analog input for the appliance.
→ `AUX Analog` is displayed.

4 Operate your appliance as usual and adjust volume and sound with the unit.

Note: It is not possible to connect a turntable directly to AUX IN L/R. *If you wish to use a turntable with the unit, you have to connect an amplifier to* AUX IN L/R *on the unit. Then connect the turntable to the amplifier.*

LINE OUT L/R

You can use these outputs for playback or recording on any analog audio equipment e.g. amplifier or tape recorder.

- Use a cinch cable to connect the analog audio inputs of the additional appliance with LINE OUT L/R on the unit and operate your appliance as usual.

Digital audio connections

DIGITAL IN

You can use this coaxial input for recordings from any digital audio equipment with a digital coaxial output e.g. CD player or DVD player.

1 Use a coaxial cable to connect the coaxial output of the additional appliance with DIGITAL IN on the unit.

2 Press DIGITAL / ANALOG AUX repeatedly to select the digital input for the appliance.
→ `AUX Digital` is displayed.

3 Operate your appliance as usual.

DIGITAL OUT

You can use this coaxial output for recordings on any digital audio equipment with a digital coaxial input e.g. CD recorder.

- Use a coaxial cable to connect the coaxial input of the additional appliance with DIGITAL OUT on the unit and operate your appliance as usual.

Connecting a subwoofer

A subwoofer can be used to enhance the bass performance of your unit dramatically.

1 Use a cinch cable to connect the input of the subwoofer with SUBWOOFER OUT at the unit.

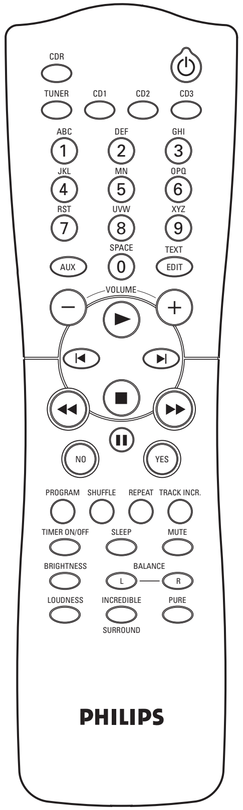
2 Follow the instructions supplied with the subwoofer.

REMOTE CONTROL

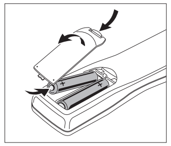
Remote control buttons

⏻	switches the unit to standby
CDR, TUNER, CD1, CD2, CD3, AUX	selects the sources
Number/alphabet keys	
1–0	keys in numbers for tracks or stations
ABC – XYZ	keys in letters for text
SPACE	keys in a space within the text
EDIT TEXT	enters the text edit menu
– VOLUME	decreases the volume
+ VOLUME	increases the volume
▶	starts playback/recording
⏮	CDC, CDR: selects the previous track TUNER: selects the previous preset tuner station
⏭	CDC, CDR: selects the next track TUNER: selects the next preset tuner station
■	stops CD play/recording, closes program memory
⏩	CDC, CDR: searches forward, reviews the tracks in a program, controls the cursor in different menus TUNER: tunes to a higher radio frequency
⏪	CDC, CDR: searches backward, reviews the tracks in a program, controls the cursor in different menus TUNER: tunes to a lower radio frequency
⏸	interrupts playback/recording
YES	selects a selection
NO	cancels a selection
PROGRAM	opens/closes the program menu
SHUFFLE	plays tracks in random order
REPEAT	repeats a track, the entire CD(RW) or the program
TRACK INCR.	selects automatic or manual increment of a track
TIMER ON/OFF	activates and deactivates the timer
SLEEP	activates the sleep timer
MUTE	mutes the sound
BRIGHTNESS	controls the brightness of the display
L BALANCE	adjusts the volume balance to the left speaker
R BALANCE	adjusts the volume balance to the right speaker
LOUDNESS	boosts treble and bass
INCREDIBLE SURROUND	creates an incredibly wide stereo effect
PURE	switches DSC settings on/off

Note: Always press the source key of the source you wish to control (e.g. CD1*) before selecting the desired function key (e.g.* SHUFFLE).


CDR
TUNER
CD1
CD2
CD3
ABC
DEF
GHI
1
2
3
JKL
MN
OPQ
4
5
6
RST
UVW
XYZ
7
8
9
SPACE
TEXT
AUX
0
EDIT
VOLUME
NO
YES
PROGRAM
SHUFFLE
REPEAT
TRACK INCR.
TIMER ON/OFF
SLEEP
MUTE
BRIGHTNESS
BALANCE
L
R
LOUDNESS
INCREDIBLE
PURE
SURROUND
PHILIPS

Remote control batteries



Open the battery compartment of the remote control and insert 2 alkaline batteries, type **AA** (R06, UM-3).

Do not use old and new or different types of batteries in combination.

Remove batteries if they are dead or if the remote control is not to be used for a long time.

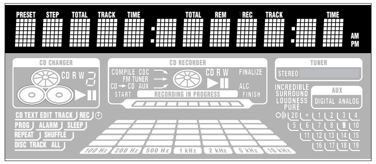
Batteries contain chemical substances, so they should be disposed of properly.

DISPLAY

Display

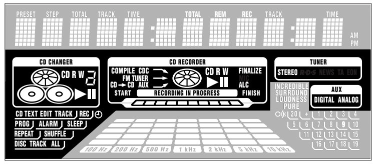
The display of the unit is divided into 3 sections, which show you the following:

Information area


PRESET
STEP
TOTAL
TRACK
TIME
TOTAL
REM
REC
TRACK
TIME
AM
PM
CD CHANGER
CD R W
CD RECORDER
COMPILE CDC
FM TUNER
CD → CD AUX
START
RECORDING IN PROGRESS
FINISH
CD R W
FINALIZE
ALC
TUNER
STEREO
INCREDIBLE
SURROUND
LOUDNESS
PURE
AUX
DIGITAL ANALOG
CD TEXT EDIT TRACK
REC
PROG
ALARM
SLEEP
REPEAT
SHUFFLE
DISC TRACK ALL
20 + 1 2 3 4
5 6 7 8 9 10
11 12 13 14 15
16 17 18 19
100 Hz
200 Hz
500 Hz
1 kHz
2 kHz
5 kHz
10 kHz

This area is used for feedback of the CD changer, CD recorder, tuner frequencies, menu options, values and scrolling text messages.

Status lights and flags


PRESET
STEP
TOTAL
TRACK
TIME
TOTAL
REM
REC
TRACK
TIME
AM
PM
CD CHANGER
CD R W
CD RECORDER
COMPILE CDC
FM TUNER
CD → CD AUX
START
RECORDING IN PROGRESS
FINISH
CD R W
FINALIZE
ALC
TUNER
STEREO
INCREDIBLE
SURROUND
LOUDNESS
PURE
AUX
DIGITAL ANALOG
CD TEXT EDIT TRACK
REC
PROG
ALARM
SLEEP
REPEAT
SHUFFLE
DISC TRACK ALL
100 Hz
200 Hz
500 Hz
1 kHz
2 kHz
5 kHz
10 kHz

Flags

CD TEXT	CD text is available
CD TEXT EDIT	text edit menu is active
EDIT TRACK	track edit menu is active
REC 🕘	record timer is selected
PROG	program menu is active
🕘	clock is selected
ALARM 🕘	alarm timer is selected
SLEEP	sleep timer is selected
REPEAT DISC	selected disc is played repeatedly
REPEAT TRACK	current track is played repeatedly
REPEAT ALL	all discs in the CD changer (or the program) are (is) played repeatedly
SHUFFLE	either all tracks of the program or of the loaded disc(s) in the CD changer or CD recorder are played in random order

CD Changer

💿	number of disc trays loaded
💿 ▶	playback is activated
💿 ⏸	playback is interrupted
CD 1, 2, 3	disc tray 1, 2 or 3 is selected and loaded with a pre-recorded CD, finalized CDR or CDRW
CD R 1, 2, 3	disc tray 1, 2 or 3 is selected and loaded with an unfinalized CDR
CD RW 1, 2, 3	disc tray 1, 2 or 3 is selected and loaded with an unfinalized CDRW

CD Recorder

COMPILE CDC → 💿	current program is being recorded with high speed dubbing and auto finalize
FM TUNER → 💿	FM station is being recorded
CD→CD → 💿	current disc is being recorded with high speed dubbing and auto finalize
AUX → 💿	material from an external source is being recorded
💿 ▶	playback is activated
💿 ⏸	playback is interrupted
RECORDING IN PROGRESS	recording in progress
START **FINISH**	status of recording progress is shown
CD	pre-recorded CD, finalized CDR or CDRW inserted
CD R	unfinalized CDR inserted
CD RW	unfinalized CDRW inserted
FINALIZE	(un)finalizing will start
ALC	auto level control is active

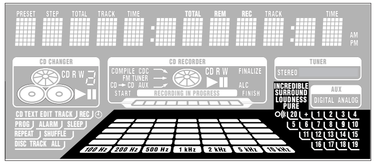
Tuner

STEREO	FM station is being received in stereo

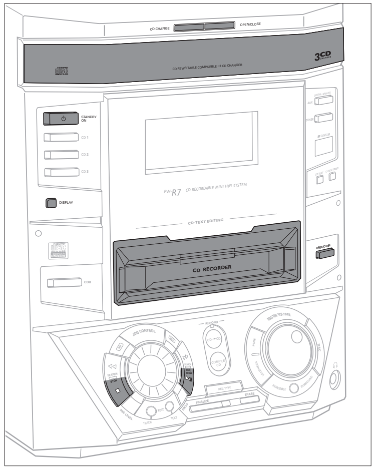
AUX

DIGITAL	digital input in use for external source
ANALOG	analog input in use for external source

Music calendar, sound lights and remote control


PRESET
STEP
TOTAL
TRACK
TIME
TOTAL
REM
REC
TRACK
TIME
AM
PM
CD CHANGER
CD R W
CD RECORDER
COMPILE CDC
FM TUNER
CD → CD AUX
START
RECORDING IN PROGRESS
FINISH
CD R W
FINALIZE
ALC
TUNER
STEREO
INCREDIBLE
SURROUND
LOUDNESS
PURE
AUX
DIGITAL ANALOG
CD TEXT EDIT TRACK
REC
PROG
ALARM
SLEEP
REPEAT
SHUFFLE
DISC TRACK ALL
20 + 1 2 3 4
5 6 7 8 9 10
11 12 13 14 15
16 17 18 19
100 Hz
200 Hz
500 Hz
1 kHz
2 kHz
5 kHz
10 kHz

INCREDIBLE SURROUND	Incredible Surround is active
LOUDNESS	Loudness is active
PURE	DSC settings are switched off
O(((	command from remote control is being received
Music calendar	
1–20	CDC, CDR: actual track number played, number of tracks on a disc/program TUNER: preset number of tuned station
+	CDC, CDR: disc or program contains more than 20 tracks TUNER: more than 20 radio stations are stored
▦	spectrum analyzer



Switching on, switching to standby

- **To switch the unit on** press ⏻ STANDBY ON on the unit.

- **To switch the unit to standby** press ⏻ STANDBY ON again on the unit (⏻ on the remote control).

Loading the CD changer, CD recorder

Important!

1) This system is designed for regular CD(RW)s. Therefore, do not use any accessories such as disc stabilizer rings or CD treatment sheets, etc. as offered on the market, because they may cause jamming of the changer mechanism.

2) Do not load more than one disc into one disc tray.

1 ***CD changer:***
Press OPEN/CLOSE on the unit to open the CD changer tray.
→Open CDC is displayed and the tray is opened.

CD recorder:
Press OPEN/CLOSE on the unit to open the CD recorder tray.
→Open CDR is displayed and the tray is opened.

2 ***CD changer:***
You can load up to three discs in the CD changer for continuous playback without interruption. Insert an audio disc (printed side up) in the right disc tray.
- You can load another disc in the left disc tray.
- To insert a third audio disc, press CD CHANGE on the unit.
  →The CD carousel will rotate until the empty disc tray is at the right hand side.

CD recorder:
Insert an audio disc (printed side up) in the tray.

3 ***CD changer:***
Press OPEN/CLOSE on the unit again to close the tray.
→The tray is closed and Reading is displayed.
→If an unfinalized disc is inserted, Initializing will be displayed.
→CD, the disc tray number, the total number of tracks and the total playing time of the disc in the last selected disc tray are displayed. The track numbers light up in the music calendar.

CD recorder:
Press OPEN/CLOSE on the unit again to close the tray.
→The tray is closed and Reading is displayed.
→If an unfinalized disc is inserted, Initializing will be displayed.
→CDR, the total number of tracks and the total playing time of the disc are displayed. The track numbers light up in the music calendar.

Playing a CD(RW)

1 Press PLAY/PAUSE ⊳II (▶ on the remote control) to start playback.
CD changer:
→CD, the disc tray number, the current track number and elapsed playing time are displayed. The current track number is also blinking in the music calendar.
CD recorder:
→CDR, the current track number and elapsed playing time are displayed. The current track number is also blinking in the music calendar.

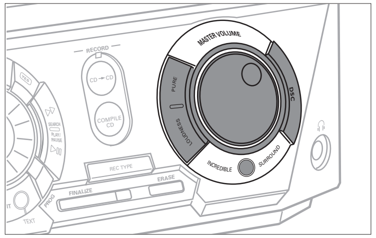
- To switch through the following information, repeatedly press DISPLAY on the unit:
  →Track number, remaining playing time of current track
  →Track number, remaining playing time of disc
  →Track number, actual playing time of current track

2 Press STOP □ (■ on the remote control) to stop playback.
CD changer:
→CD, the disc tray number, the total number of tracks and the total playing time of the disc are displayed.
CD recorder:
→CDR, the total number of tracks and the total playing time of the disc are displayed.

- To switch through the following information, repeatedly press DISPLAY on the unit:
  →Total number of tracks, total playing time of disc
  →CD text is displayed.

- You can interrupt playback by pressing PLAY/PAUSE ⊳II (II on the remote control).
  →The time where playback was interrupted is blinking.

- To resume playback press PLAY/PAUSE ⊳II (▶ on the remote control) again.



Sound control

Volume adjustment
- Adjust the volume by using MASTER VOLUME (− VOLUME/+ on the remote control).
  →The volume level in dB (decibel) is displayed.

DSC
Digital **S**ound **C**ontrol enables you to select different preset sound settings.
- Press DSC repeatedly to select the desired sound characteristics.
  →Optimal, Jazz, Classic, Rock, Vocal, Techno.

Incredible Surround
Stereo sound is determined by the distance between the front speakers. Incredible Surround enables you to enjoy an incredibly wide stereo effect, regardless of the speakers' distance.

- Press INCREDIBLE SURROUND (INCREDIBLE SURROUND on the remote control) to switch the surround sound effect either on or off.
  →INCREDIBLE SURROUND is shown and Incredible Surround is displayed if the surround sound effect is on.

Note: The effect of Incredible Surround may vary with different types of music.

PURE
- Press PURE repeatedly to switch the DSC settings either on or off.
  →PURE is shown and Pure is displayed if the DSC settings are switched off.

LOUDNESS
- Press LOUDNESS to switch loudness either on or off.
  →LOUDNESS is shown and Loudness is displayed if loudness is on.

MUTE
This feature allows you to temporarily switch off the sound without switching off the unit.
1 Press MUTE on the remote control to switch off the sound.
→Mute is displayed and playback/recording will be continued without sound.

2 Press MUTE on the remote control again to switch on the sound again.

Speaker balance
It is possible to adjust the relative volume balance between the connected front speakers.

- Press L BALANCE or R BALANCE on the remote control to adjust the relative volume of the left or right front speaker.
  →Balance L (or R) and the actual volume of the left (or right) front speaker are displayed.
  →When the volume of both speakers is balanced, Balance L=R is displayed.

Demo mode

The demo mode displays various features of the unit and will start automatically.

- *If any source key is pressed:*
  →The unit switches to the selected source.
  If ⏻ STANDBY ON *is pressed:*
  →The unit switches to standby. After a few seconds, the demonstration will start again.

Cancelling the demo mode
- Keep STOP □ on the unit pressed for at least 3 seconds to cancel the demo mode.
  →The demo mode is cancelled permanently. The unit switches to standby. A few seconds later the unit switches to an economy power save mode.

Selecting a disc on the CD changer

- Press either CD 1, CD 2 or CD 3 to select a particular disc.

Selecting a track and searching

Selecting a track during playback

- Rotate JOG CONTROL (press ⏮ or ⏭ on the remote control) to skip to the beginning of the previous or next track on the selected disc.
  → Playback continues with the selected track.

Selecting a track when playback is stopped

1 Rotate JOG CONTROL (press ⏮ or ⏭ on the remote control) to skip to the required track number.

2 Press PLAY/PAUSE ▷❚❚ (▶ on the remote control) to start playback.
→ Playback starts with the selected track.

Note: Instead of using ⏮ *or* ⏭ *on the remote control, you can also directly key in the required track number by using the numerical keys. For 2-digit numbers, press the keys in rapid succession.*

Searching for a passage during playback

1 Keep ⊲⊲ SEARCH or ⊳⊳ SEARCH (◀◀ or ▶▶ on the remote control) pressed to find a particular passage in a backward or forward direction.
→ Searching is started and playback continues at a low volume. After 3 seconds, the search speeds up with volume muted.

2 Release the key at the desired passage.
→ Normal playback continues.

Note: During SHUFFLE, *while repeating a track or while playing a program, searching is only possible within the current track.*

SHUFFLE and REPEAT

Repeating a track, the disc or the program

1 Repeatedly press REPEAT on the remote control during playback to select either:
→ **REPEAT TRACK**: The current track is played repeatedly.
→ **REPEAT DISC**: The entire selected disc is played repeatedly.
→ **REPEAT ALL**: All discs in the CD changer (or the program) are (is) played repeatedly.

2 Playback starts in the chosen mode.

3 To return to normal playback, press REPEAT on the remote control until the display indication disappears.

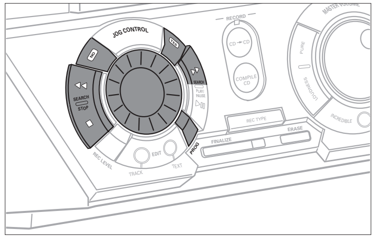
Note: **REPEAT DISC** *is not possible during* SHUFFLE *or while playing a program.*

Playing tracks in random order

1 Press SHUFFLE on the remote control during playback.
→ **SHUFFLE** is shown and either all tracks of the program or of the loaded disc(s) in the CD changer or CD recorder are played in random order.

2 To return to normal playback, press SHUFFLE again.

CD text



Programming track numbers

You can select tracks and store them either in the CD changer or CD recorder memory. If you use the program for playback you can choose one of the two memories, else if you like to specify tracks for recording, use the CD changer memory only! You can store any track more than once.

1 Load the desired disc(s) in the disc tray(s).

2 Press either CD 1, CD 2, CD 3, or CDR to select the disc.

3 Press PROG on the unit (PROGRAM on the remote control).
→ **PROG** starts blinking and `Program` is displayed.

4 ***If either CD 1, CD 2 or CD 3 is selected:***
Rotate JOG CONTROL to select either:
→ `CD1` (or `2`, `3`) `All`: All tracks of CD 1 (or 2, 3) will be programmed.
→ `CD1` (or `2`, `3`) and track number: The track number of CD 1 (or 2, 3) will be programmed.

If CDR is selected:
Rotate JOG CONTROL (press the numerical keys on the remote control; for 2-digit numbers, press the keys in rapid succession) to select a track number.

5 Press YES to store your selection in the memory.
→ The number of programmed tracks (**STEP**), `Prog` and the total program time are displayed. The track number blinks in the music calendar.

6 Select and store all desired tracks in this way.

7 Press PROG on the unit (PROGRAM on the remote control) to end programming.
→ **PROG** stays shown and the program is currently available.

Note: If the maximum number of programmable tracks is reached, the display shows `Program full`.

Erasing a track from the program

1 If necessary, press STOP ☐ on the unit (■ on the remote control) to stop playback.

2 Press either CD 1, CD 2, CD 3, or CDR to select the desired memory.

3 Press PROG (PROGRAM on the remote control), followed by ⊲⊲ SEARCH or ⊳⊳ SEARCH (◀◀ or ▶▶ on the remote control) to move through the program steps.
→ The track number at the selected step and the total program time are displayed.

4 Press NO to remove the track from the program.
→ `Cleared` is displayed briefly.
→ The next programmed track number will move up to this position and is displayed together with the step number and the remaining total program time.

Clearing the program

1 If necessary, press STOP ☐ on the unit (■ on the remote control) to stop playback.

2 Press NO.
→ `Clear Prog?` is displayed.

3 Press YES to clear the program.
→ `Prog Cleared` will be displayed and **PROG** goes off.

Note: When you open the CD recorder tray or the CD changer tray the respective program will be cleared.

Making a program for recording

1 Select and store all desired tracks in the CD changer memory (see “Programming track numbers”).

2 Enter the recording menu (see “Internal recording”).

- If the total time of the program is of larger size than the remaining recording time of the CDR(W):
  → `Not fitting!` will be displayed briefly, followed by the remaining recording time and `Record Prog?`
  If you nevertheless start recording, only those tracks of the program that fit onto the CDR(W) will be recorded in entirety.

- To change the program, press NO.
  → `Edit Program` will be displayed briefly, **PROG** and the time of the program start blinking. Now you can change the program (see “Programming track numbers”, “Erasing a track from the program” and “Clearing the program”).

ABOUT RECORDING

Basic information

The CD recorder deck offers you 3 main functions:
- **Recording** from the internal CD changer and tuner or from a selected external source
- **Finalizing** your CDR(W) discs and **unfinalizing** your CDRW discs
- **Erasing** a CDRW disc

The recording procedure is the same for CDR and CDRW discs. ***Make sure the CDR(W) is absolutely free of scratches and dust particles.***

For recordings, the minimum track length is 4 seconds. You can record up to a maximum of 99 tracks on a disc. The minimum of recording time left on the disc is 7 seconds. Otherwise Does not fit is displayed and you cannot enter the record standby mode.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
- *play a recorded CDR on a standard CD player or*
- *play a recorded CDRW on a CDRW compatible CD player and CD recorder.*

Copyright protection

The **S**erial **C**opy **M**anagement **S**ystem (SCMS) prevents the making of a digital copy from a digital copy. The system allows making a digital recording from the original, however in some countries this may require the authorization of copyright holders.

When you try to record copy protected material from an external source, Copy Protect will be displayed. No further digital recording is possible then.

When you try to record copy protected material from the internal CD changer, no digital recording is possible, however the CD recorder will automatically switch to analog recording.

Recording CD text

If the original CD has CD Text, this text will be recorded automatically, provided that the CD text is not copy protected. In that case, recording of CD text will not be possible and Text Protect will be displayed.

Direct Line Recording (DLR)

The CD recorder is equipped with the high-performance **D**irect **L**ine **R**ecording technique. It ensures a perfect recording of the source material, meaning a true “bit for bit” recording. DLR will always become active when you make normal recordings in listen mode.

Auto Level Control (ALC)

Auto **L**evel **C**ontrol ensures that the tracks on the recorded disc have a similar volume level. At all times the already recorded tracks of the CDR(W) disc will be taken as reference for the volume level of the following recordings. ALC is active when **ALC** is shown.

Auto level control becomes active when:
- COMPILE CD is being used,
- a disc, a track or a track edit is being high speed recorded and the CDR(W) has recordings on it,
- a program (consisting from more than one disc) from the CD changer is being high speed recorded, or
- CD→CD is being used and the CDR(W) has recordings on it.

Auto level control will not become active when:
- CD→CD is being used and the CDR(W) has no recordings on it,
- making recordings from the FM tuner,
- making recordings from an external source, or
- making normal recordings in listen mode.

REC LEVEL key

You can adjust the reference record level. This is also possible when ALC is active. This feature can be used for fading your recordings in or out.

1 Keep REC LEVEL on the unit pressed to enable the rotary control to adjust the record level.

2 Turn the rotary control to the left to adjust the desired record level.
→The actual record level (in dB) will be displayed.

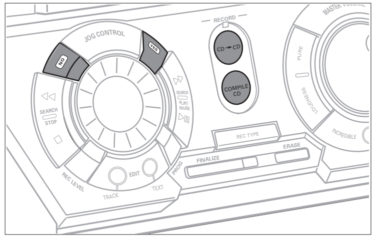
- The record level is reset after the unit has been switched to standby.

INTERNAL RECORDING

Recording modes

For internal recordings you can record from the internal CD changer or tuner. You can choose from the following recording modes:
- **High speed recording and automatic finalizing: Fast and easy!** Record and finalize your CDR(W) in one quick step while the sound is muted. You can record the current CD or a program from the CD changer.
- **High speed recording:** Record your CDR(W) fast while the sound is muted. You can record an entire CD, a track, a program or a track edit from the CD changer.
- **Normal recording and listening:** Listen to the recording while you are making it. You can record an entire CD, a track, a program or a track edit from the CD changer.
- **Manual recording:** Start and stop your recording manually while listening to it. You can do radio recordings from the FM tuner.

High speed recording and automatic finalizing



High speed recording and automatic finalizing of the current disc

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press CD→CD on the unit to enter the recording mode.
→Both decks will be selected in the display, the arrow starts blinking. The remaining recording time of the CDR(W), the total playing time of the source CD and Record CD1 (or 2, 3)? are displayed.

3 Press YES to start recording and finalizing.
→The arrow lights, **RECORDING IN PROGRESS** is shown, high speed recording and finalizing start, and the actual recording time remaining starts to count down.

Note: If a program was already available before pressing CD→CD*, this will be ignored.* **PROG** *goes off and the current disc will be recorded. After finishing the recording,* **PROG** *is shown and the program is available again.*

High speed recording and automatic finalizing (optional) of the current program

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press COMPILE CD on the unit to enter the record mode.
→Both decks will be selected in the display, the arrow starts blinking. The remaining recording time of the CDR(W), the total playing time of the source CD and Record Prog? are displayed.

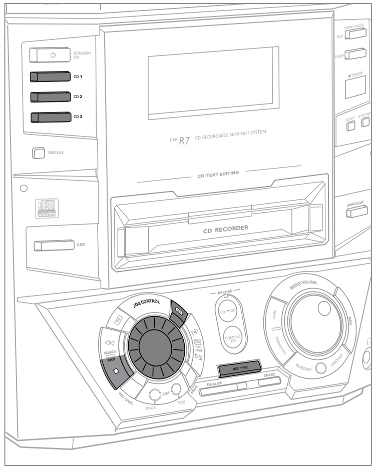
3 Press either:
YES to confirm,
or
NO to change the program.
→**PROG** starts blinking. Now you can change the program (see “Program”) and return to the record mode by pressing COMPILE CD.

4 Auto Fin? is displayed.
Press either:
YES, if the CDR(W) is to be finalized after recording,
or
NO, if the CDR(W) is not to be finalized after recording.
→The arrow lights, **RECORDING IN PROGRESS** is shown, high speed recording and finalizing (if selected) start and the actual recording time remaining starts to count down.

Note: If no program is available and you press COMPILE CD*, you enter immediately into the program menu. Start your programming and return to the record mode by pressing* PROGRAM *or* COMPILE CD.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
- *play a recorded CDR on a standard CD player or*
- *play a recorded CDRW on a CDRW compatible CD player and CD recorder.*



High speed recording

High speed recording of an entire disc, a track, a program or a track edit

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press either CD 1, CD 2 or CD 3 to select the disc from which you wish to record.

3 Press REC TYPE on the unit to enter into the recording menu.

4 Rotate JOG CONTROL to select one of the following high speed recording modes:

If a disc from the CD changer is selected:

→CD Fast?: for high speed recording of an entire disc
- Continue with step 5.

→Track Fast?: for high speed recording of a track
- Press YES to confirm.
- Rotate JOG CONTROL to select the track.
  →Rec Tr and the track number is displayed.
- Continue with step 6.

If CD changer program mode is available:

→Prog Fast?: for high speed recording of the selected disc or of the program

If CD changer track edit mode is available:

→A–B Fast?: for high speed recording of the A–B track

5 Press YES to confirm your selection.
→Both decks will be selected in the display, the arrow starts blinking. The remaining recording time of the CDR(W), the total recording time of the CDR(W) and either Record CD1 (or 2, 3)?, Record Prog? or Record A–B? is displayed.

Note: When the CDR(W) already contains a recording, ALC will also become active and **ALC** *will be shown.*

6 Press YES to start high speed recording.
→The arrow lights, **RECORDING IN PROGRESS** is shown, high speed recording starts and the actual recording time remaining starts to count down.

- To stop recording, press STOP ☐ on the unit.

Normal recording and listening

Normal recording and listening of an entire disc, a track, a program or a track edit

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Follow steps 2 and 3 of "High speed recording".

3 Rotate JOG CONTROL to select one of the following normal record options:

If CD changer is selected:

→CD Listen?: for listening to the entire disc during normal recording

→TrackListen?: for listening to the track during normal recording
- Press YES to confirm.
- Rotate JOG CONTROL to select the desired track.
  →Rec Tr and the track number is displayed.
- Continue with step 6 of "High speed recording".

If CD changer program mode is available:

→Prog Listen?: for listening to the program during normal recording

If CD changer track edit mode is available:

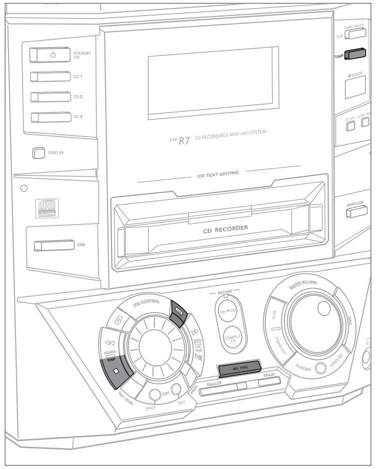
→A–B Listen?: for listening to the A–B track during normal recording

4 Follow steps 5 and 6 of "High speed recording".

- To stop recording, press STOP ☐ on the unit.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
- *– play a recorded CDR on a standard CD player or*
- *– play a recorded CDRW on a CDRW compatible CD player and CD recorder.*



Manual recording

Manual recording from the FM tuner

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press TUNER repeatedly to select the FM tuner. Then select the desired radio station (see "Tuning to radio stations").

3 Press REC TYPE on the unit to enter the recording menu.
→FM Tuner? is displayed.

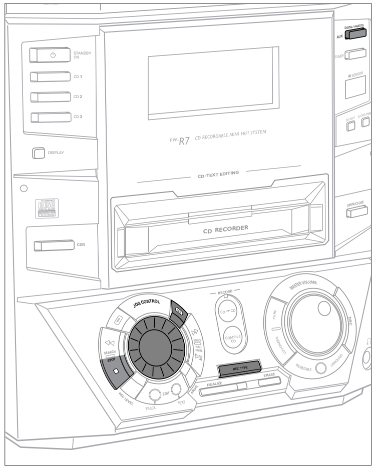
4 Press YES to confirm.
→Wait and Record? are displayed.

5 Press YES to start recording.
→The arrow lights, **RECORDING IN PROGRESS** is shown, manual recording starts and the actual recording time remaining starts to count down.

6 Press STOP ☐ to stop recording.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
- *– play a recorded CDR on a standard CD player or*
- *– play a recorded CDRW on a CDRW compatible CD player and CD recorder.*



Analog or digital recording?

When making recordings from an external source, we recommend to do analog recording only if digital recording is not possible. Digital recording will usually result in better sound quality.

Recording with automatic start

Recording of an entire disc or a track with automatic start

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Repeatedly press DIGITAL / ANALOG AUX to select the input for the external source from which you want to record.
→`AUX Digital` is displayed if the digital input is selected.
→`AUX Analog` is displayed if the analog input is selected.

3 Press REC TYPE on the unit to enter the recording menu.

4 Rotate JOG CONTROL to select either:
→`AUX CD?`: for recording with synchronized start of an entire disc
→`AUX Track?`: for recording with synchronized start of a track

5 Press YES to confirm your selection.
→`Start Source, AUX` and the remaining recording time of the CDR(W) are displayed.

6 Start playback on the selected source.
→The CD recorder starts to record simultaneously and **RECORDING IN PROGRESS** is shown. The remaining recording time on the CDR(W) is displayed.

Note: If you start playback on the selected source within a track, recording starts at the beginning of the next track or after 2.7 seconds of silence in analog recordings.

7 ***If a digital source is selected:***
After the recording process, the CD recorder stops automatically.

Note: Recordings from DAT or DCC will automatically stop after 20 seconds of silence.

If an analog source is selected:
At the end of the recording process, the CD recorder stops after a silence of 20 seconds on the source material.

- To stop recording manually, press STOP ☐ on the unit.
→**RECORDING IN PROGRESS** goes off.

Manual recording

Manual recording from an external source

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Repeatedly press DIGITAL / ANALOG AUX to select the input for the external source from which you want to record.
→`AUX Digital` is displayed if the digital input is selected.
→`AUX Analog` is displayed if the analog input is selected.

3 Press REC TYPE on the unit to enter the recording menu.

4 Rotate JOG CONTROL to select the type of recording.
→`AUX Manual?`: for manual start of recording

5 Press YES to confirm your selection.
→`Wait` is displayed.
→`Record?, AUX` and the remaining recording time of the CDR(W) are displayed.

6 Start playback on the external source in order to set the optimal recording level on the CD recorder (see "REC LEVEL key").

7 Stop playback on the external source.

8 Go to the beginning of the desired track.

9 Press YES on the unit and simultaneously start playback on the external source.
→The CD recorder starts to record and **RECORDING IN PROGRESS** is shown. The remaining recording time of the CDR(W) is displayed.

Note: If `Check Input` is flashing, check the digital connection.

10 Press STOP ☐ on the unit to stop recording.
→`Update` is displayed and **RECORDING IN PROGRESS** goes off.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
– play a recorded CDR on a standard CD player or
– play a recorded CDRW on a CDRW compatible CD player and CD recorder.

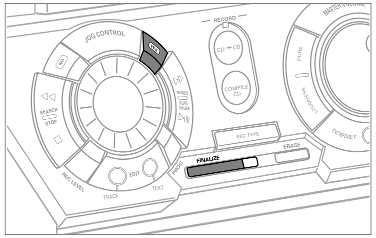
Automatic track increment

In recording mode, tracks will be incremented automatically so that the track numbers are in the same position as the original.

- To **switch** the automatic track increment function **on**, press as often as necessary TRACK INCR. on the remote control during stop when CDR is selected.
→`Auto Tr ON` is displayed and the function is on. Track increments are now automatically detected from digital source material. In analog source material, a silence of 2.7 seconds or more is detected as a track increment.

- To **switch** the automatic track increment function **off**, press as often as necessary TRACK INCR. on the remote control during stop when CDR is selected.
→`Auto Tr OFF` is displayed and the function is off. Track numbers can now be incremented manually by pressing TRACK INCR. on the remote control during recording. The minimum track length is 4 seconds.

Notes: – Track numbers cannot be changed after recording.
– The automatic track increment only works with consumer sources with a digital output signal according to the IEC 958 (consumer part) audio standard. DAT, DVD and DCC do not deliver this signal.



Finalizing CDR(W) discs

Finalizing a CDR(W) disc is a simple procedure, necessary to:
– play a recorded CDR on a standard CD player,
– play a recorded CDRW on a CDRW compatible CD player and CD recorder,
– avoid further unwanted recordings on a disc, or
– avoid erasure of tracks on a CDRW.

Notes: – Finalizing will take about 2–4 minutes.
– After finalization of the CDR(W), **CDR(W)** *changes to* **CD** *on the display.*
– During finalization no other operating commands can be executed.

Auto finalizing
When using either CD→CD or COMPILE CD, your recordings will be finalized automatically (see "High speed recording and automatic finalizing").

Manual finalizing when recording is in progress

1 Press FINALIZE on the unit during recording.
→`Auto Final?` is displayed.

2 Press YES to confirm.
→**FINALIZE** is shown. The finalization will start after recording and the actual finalizing time left will start to count down.

Manual finalizing when recording is stopped

1 Insert the CDR(W) you want to finalize in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press FINALIZE on the unit.
→`Finalize?` is displayed.

4 Press YES to start finalizing.
→**FINALIZE** is shown, `Final` is displayed and the actual finalizing time left starts to count down.

Unfinalizing CDRW discs

If you want to record (or erase) on (from) a finalized CDRW, you have to unfinalize it first.

Notes: – Unfinalizing will take approximately 2 minutes.
– After unfinalizing of the CDRW, **CD** *changes to* **CDRW** *on the display.*
– When unfinalizing a CDRW with CD text on it available, this text will be transferred to the CD recorder memory. In case the memory is full, you have to erase text (see "Erasing from the memory") or to finalize another disc first in order to obtain memory space.

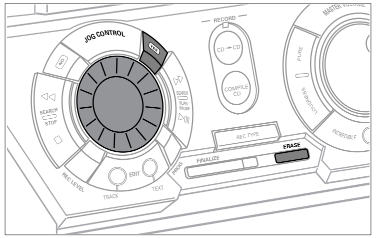
1 Insert the CDRW you want to unfinalize in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press FINALIZE on the unit.
→Unfinalize? is displayed.

4 Press YES to start unfinalizing.
→Unfinal is displayed and the operation time remaining starts to count down.

Erasing from a CDRW disc



It is possible to erase one or more tracks (starting from the end of the last track) or the entire CDRW.

Erasing an entire CDRW

1 Insert the CDRW you want to erase in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press ERASE to enter the erasing menu.

4 Rotate JOG CONTROL to select:
→Erase Disc?: for erasing the entire disc

5 Press YES to confirm your selection.
→Erase?, the total playing time and the total number of tracks to be erased are displayed. All track numbers will blink in the music calendar.

6 Press YES to start erasing.
→Erase is displayed and the operation time remaining starts to count down. The track number of the actual erased track will go off in the music calendar.

Erasing one or more tracks

1 Insert the CDRW from which you want to erase tracks in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press ERASE to enter the erasing menu.

4 Rotate JOG CONTROL to select the track number(s) you wish to erase.
→Erase and the track number (e.g. 10+)? are displayed.

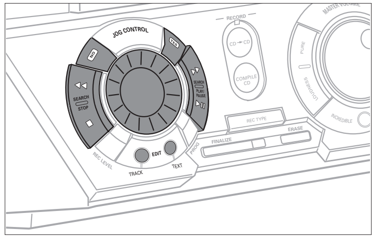
- To select more tracks to be erased, repeat step 4.

Note: When erasing more tracks, the tracks to be erased must be selected in sequence, starting from the last recorded track. Example: The CDRW has 5 tracks recorded on it. Now, you can erase tracks 5 and 4. You can also erase tracks 5, 4 and 3, but you cannot erase tracks 5 and 3!

→All track numbers selected for erasing will blink in the music calendar. The remaining track numbers light up.

5 Press YES to confirm your selection.
→Erase? is displayed.

6 Press YES to start erasing.
→Erase is displayed and the operation time remaining starts to count down. The track number of the currently erased track will go off in the music calendar.



EDIT TEXT (on CD recorder only)

Storing text during stop mode

After you have recorded your CDR(W) you can enter text, e.g. names to discs and tracks. The text will be displayed during playback. You can enter up to 60 characters per text field. Only use an unfinalized CDR or CDRW (finalized CDRW must be unfinalized first).

1 If necessary, press STOP ☐ on the unit (■ on the remote control) to stop playback.

2 Press CDR to select the CD recorder.

3 Press EDIT TEXT on the unit to enter the text edit menu.
→**CD TEXT EDIT** is blinking, Text Edit is displayed.

4 Press YES to confirm.

5 Rotate JOG CONTROL to select either:
→Album Artist: for editing the CD artist.
→Album Title: for editing the CD title.
→Artist Tr 1 or (2, 3,…): for editing the artist of track 1 or (2, 3,…).
→Title Tr 1 or (2, 3,…): for editing the title of track 1 or (2, 3,…).

6 Press YES to confirm the selection.

7 Rotate JOG CONTROL (press the alphabet keys on the remote control) to select a character.

8 Press YES to confirm the selection.
→The cursor moves to the next character space.

9 Repeat steps 7 and 8 for adding further characters.

10 Press EDIT TEXT to save the characters that have been selected and to exit to the last position in the text editing menu.
→Update is displayed.

Storing text during recording

You can store and edit text even while recording a single track or single CD, or when recording from an external source or tuner. Editing text during finalizing is not possible. Make sure, when using high speed recording and automatic finalizing, to enter the text before finalizing starts, otherwise automatic finalizing will be cancelled.

- Follow steps 3–10 of "Storing text during stop mode".

Note: Editing text is not possible when a copy protected track is analog recorded. Editing is stopped, CDText Saved *is displayed and your text is saved for later editing.*

Auto copied text

When an artist's name has been stored for a track, it will be copied automatically into the next track.

- Press either:
  EDIT TEXT to confirm the copied text,
  or
  NO to delete the copied text and enter new text.

Inserting a space

1 Press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) to move to the position where the space is to be inserted.
→The position starts blinking.

2 Press YES to confirm the position of the insert character.
→A space will be inserted, text will move to the right.

Deleting and substituting a character

1 Press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) to move to the character's position to be deleted or substituted.
→The character starts blinking.

2 ***If you want to delete the character:***
Press NO.
→The character is deleted and the text is shifted one position to the left.

If you want to substitute the character:
Rotate JOG CONTROL (press the alphabet keys on the remote control) to select a new character.

Press YES to confirm the selection.

- To change another character, press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control).

Erasing text

1 Press EDIT TEXT to enter the text edit menu.
→ **CD TEXT EDIT** is blinking, Text Edit is displayed.

2 Rotate JOG CONTROL to select the text erase menu.
→ Text Erase is displayed.

3 Press YES to confirm.

4 Rotate JOG CONTROL to select one of the following:
→ All Text: All text of the selected disc is chosen to be erased in one step.
→ Album Artist: CD artist's name is chosen to be erased.
→ Album Title: CD title is chosen to be erased.
→ Artist Tr 1 or (2, 3,…): artist's name of track 1 or (2, 3,…) is chosen to be erased.
→ Title Tr 1 or (2, 3,…): title of track 1 or (2, 3,…) is chosen to be erased.

5 Press YES to confirm your selection.
→ Erase? or Erase All? is displayed.

6 Press YES to start erasing.
→ Update is displayed and the chosen text is erased.

Erasing from the memory

When the text memory of your CD recorder is full, the messages Memory Full and Finalize Disc will be displayed. If you still want to add a new disc to the text memory, you either have to erase another disc from the memory or you have to finalize another disc.

1 Press EDIT TEXT to enter the text edit menu.
→ **CD TEXT EDIT** is blinking, Text Edit is displayed.

2 Rotate JOG CONTROL to select the memory view menu.
→ Text Memory is displayed.

3 Press YES to confirm.

4 Rotate JOG CONTROL to select the disc you wish to erase from the text memory.

5 Press YES to confirm.
→ Erase Memory is displayed.

6 Press YES to confirm the text erasure of that particular disc.

Note: If there are no discs stored in the text memory, Memory Empty will be displayed.

Track editing (on CD changer only)

You can create a "track" by marking a passage of music within one track on the current disc. This new "track" can be used for recording or playing. The minimum track length is 4 seconds.

1 Press EDIT TRACK on the unit.
→ **EDIT TRACK** starts blinking, Track and the current track number ? are displayed. The current track number also blinks in the music calendar.

2 Rotate JOG CONTROL until the desired track number is displayed.

3 Press YES to confirm the selected track.
→ The marker position A and the track time will be displayed. The first 4 seconds of the track will be played continuously.

4 Press PLAY/PAUSE ⊳❚❚ on the unit to play to the desired start position of your new "track" (The initial position of marker A is always the start of the chosen track).

- To fast forward to the desired start position, press ⊲⊲ SEARCH or ⊳⊳ SEARCH on the unit.

- To fine tune the position, first press PLAY/PAUSE ⊳❚❚ on the unit, then rotate JOG CONTROL.

5 Press YES to confirm the position of marker A.
→ The marker position B and the new "track" time will be displayed. The first 4 seconds before marker position B **until marker position** B will be played continuously.

6 Press PLAY/PAUSE ⊳❚❚ on the unit to play to the stop position of your new "track" (the initial position of marker B is always the position of marker A plus 4 seconds).

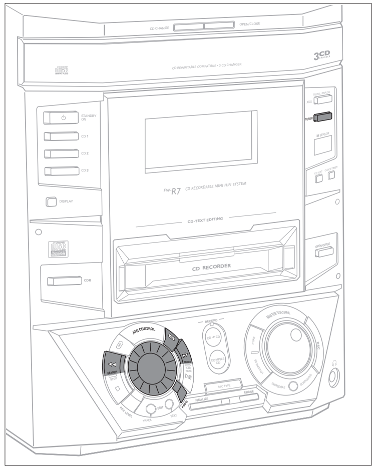
7 Press YES to confirm the marked passage.
→ **EDIT TRACK** is shown, A–B and the track edit time are displayed.

Note: If you open the CD changer tray, the edit is deleted.

Clearing the track edit

1 Press NO during stop.
→ Clear A–B? is displayed.

2 Press YES to clear the markers.
→ The markers A–B are cleared.



Tuning to radio stations

1 Press TUNER to select the tuner.
→ Tuner is scrolled.

2 Press TUNER again to select the desired waveband.
→ The selected waveband is displayed.

3 Keep ⊲⊲ SEARCH or ⊳⊳ SEARCH (◀◀ or ▶▶ on the remote control) pressed for more than a half second.
→ The selected waveband and Searching are displayed. The radio tunes to a station with sufficient signal strength.

4 Repeat searching until you find the desired station.

- To tune to a weak station, briefly press ⊲⊲ SEARCH or ⊳⊳ SEARCH (◀◀ or ▶▶ on the remote control) as often as necessary for optimum reception.

Storing radio stations

It is possible to store up to 40 radio stations. Stations can be selected and programmed automatically or you can do that yourself. Programming will overwrite your former presets starting from the last active preset station. After programming the last stored preset station will be tuned.

Automatic programming

If no preset is tuned, automatic programming starts at preset number one.

1 Follow steps 1 and 2 of "Tuning to radio stations".

2 Keep PROG (PROGRAM on the remote control) pressed for more than 2 seconds.
→ Autoprogram is displayed, **PROG** and the current preset number in the music calendar start blinking.
→ All available radio stations for the selected waveband are stored automatically. **PROG** goes off, the preset number, the waveband and the frequency of the last preset station are displayed briefly.

- To store radio stations for another waveband, repeat steps 1–2. Make sure to select the next available preset number first before proceeding, otherwise already programmed radio stations may be erased.

- To exit the automatic programming, press PROG (PROGRAM on the remote control).

Note: Strong stations will always automatically be programmed first, followed by the weak stations.

Manual programming

1 Follow steps 1 and 2 of "Tuning to radio stations".

2 Keep PROG (PROGRAM on the remote control) pressed for less than 2 seconds.
→ **PROG** and the current preset number in the music calendar start flashing.

3 Press ⊲⊲ SEARCH or ⊳⊳ SEARCH (◀◀ or ▶▶ on the remote control) to tune to the desired radio station.

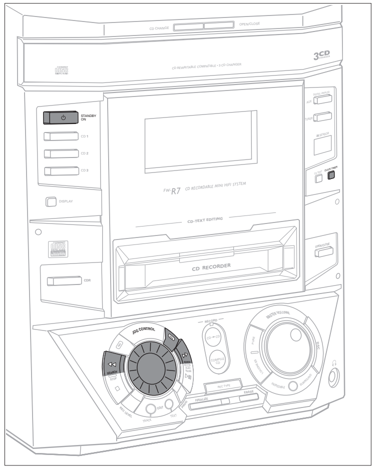
- To allocate the radio station to another preset number, rotate JOG CONTROL (press ❙◀ or ▶❙ on the remote control).

4 Press YES to confirm the setting.
→ **PROG** goes off, the preset number, the waveband and the frequency of the preset station are displayed.

- To exit manual programming, press PROG (PROGRAM on the remote control).

Tuning to preset stations

- Use JOG CONTROL (❙◀ or ▶❙ on the remote control) until the preset number of the desired station is displayed.



Clock setting

Manual clock setting

1 Press ⏻ STANDBY ON as often as necessary on the unit to switch the unit to standby.

2 Press CLOCK/TIMER on the unit.

3 Rotate JOG CONTROL to select the clock.
→ Clock is displayed and ◷ starts blinking.

4 Press YES to confirm the selection.
→ The day of the week digit blinks.

5 Rotate JOG CONTROL to set the day.

6 Use ◁◁ SEARCH or ▷▷ SEARCH on the unit to move from day of the week to hour.

7 Rotate JOG CONTROL to set the hour.

8 Repeat steps 6 and 7 to set the minutes.

9 Press YES to confirm the settings.

You can select different timer functions which will be activated at a chosen time. Make sure the clock is set before using one of these features.

Sleep timer

You can set a certain period of time before the unit switches off.

1 Press SLEEP on the remote control until the desired sleeper time is displayed.
→ **SLEEP** is shown and Sleep 60 min, 45 min, 30 min,15 min is displayed or, Sleep OFF is displayed.

2 As soon as the desired time is displayed, do not press SLEEP again.
→ After the chosen time has elapsed, the unit switches to standby.

- To deactivate the sleep timer, press SLEEP on the remote control until Sleep OFF is displayed.

Alarm timer

Alarm timer setting

The unit can be used as an alarm clock, whereby the tuner, CD recorder or CD changer starts playback automatically at a preset time.

1 Press ⏻ STANDBY ON as often as necessary on the unit to switch the unit to standby.

2 Press CLOCK/TIMER on the unit.

3 Rotate JOG CONTROL to select the alarm timer.
→ Alarm is displayed, **ALARM** is blinking.

4 Press YES to confirm the selection.
→ The hour digit is blinking.

5 Rotate JOG CONTROL to set the hour.

6 Use ◁◁ SEARCH or ▷▷ SEARCH on the unit to move from hour to minutes.

7 Rotate JOG CONTROL to set the minutes.

8 Press YES to confirm the time settings.

9 Rotate JOG CONTROL to select the source you want to be woken up with.

10 Press YES on the unit to confirm the source selection.

- To stop the alarm, press ⏻ STANDBY ON on the unit.

Record timer

Record timer setting

The unit can do recordings automatically from an external source or from a preset radio station at a preset time.

1 Follow steps 1 and 2 of “Alarm timer setting”.

2 Rotate JOG CONTROL to select the record timer.
→ Rec Timer is displayed, **REC** is shown and ◷ starts blinking.

3 Press YES on the unit to confirm the selection.
→ The hour digit for the start of recording blinks.

4 Rotate JOG CONTROL to set the hour of start of recording.

5 Use ◁◁ SEARCH or ▷▷ SEARCH on the unit to move from hour to minutes of start of recording.

6 Rotate JOG CONTROL to set the minutes of start of recording.

7 Continue this procedure by using ◁◁ SEARCH or ▷▷ SEARCH to move on to hour and minutes of end of recording and to the day of the week. After each move, always rotate JOG CONTROL to do the settings.

8 Press YES to confirm the settings.

9 Rotate JOG CONTROL to select from which you want to record.

If you have chosen the tuner as source:
Rotate JOG CONTROL again to select a preset radio station and confirm this selected station by pressing YES.

10 Press YES on the unit to confirm the source selection.

- To stop the recording press STOP □ on the unit.

Switching the alarm and record timer on/off

- Press TIMER ON/OFF on the remote control repeatedly to switch the alarm and/or record timer on or off:
  - → **ALARM** is shown and Alarm ON is displayed when the alarm timer is on.
  - → **REC** is shown and REC Timer ON is displayed when the record timer is on.
  - → **ALARM** and **REC** are shown, REC+Alarm ON is displayed when the alarm and record timer are on.
  - → **ALARM** and **REC** go off, REC+AlarmOFF is displayed when the alarm and record timer are off.

TECHNICAL DATA

Subject to modification without notice.

General

AC Power	120 V / 60 Hz
Power consumption	
Active	66 W
Standby	< 22 W
Economy power save mode	< 2 W
Dimensions, w × h × d	10.4 × 12.2 × 15.7 in.
Weight (without speakers)	9 kg

Amplifier

Output power	2 × 50 W FTC, 6 Ω, 1 kHz, THD 10%
Frequency response	40–16,000 Hz FTC, +0.5/-1.5 dB
S/N ratio	≥ 80 dBA (IEC)
Input sensitivity	
AUX IN L/R	800 mV
DIGITAL IN	500 mV_{pp} (75 Ω)/12–56 kHz
Output	
Impedance speakers	≥ 6 Ω
Impedance headphones	32 Ω–600 Ω
LINE OUT L/R	500 mV
DIGITAL OUT	500 mV_{pp} (75 Ω)/44.1 kHz
SUBWOOFER OUT	1 V

CD changer

Number of programmable tracks	40
Frequency range	20–20,000 Hz
S/N ratio	≥ 92 dBA
Cross talk	≤ -65 dB (1 kHz)
Total harmonic distortion	≤ -94 dB (1 kHz)

CD recorder

Number of programmable tracks	99
CD playback	
Frequency range	20–20,000 Hz
S/N ratio playback	≥ 92 dBA
Cross talk	≤ -65 dB (1 kHz)
Total harmonic distortion	≤ -84 dB (1 kHz)
Analog recording, digital playback	
Frequency range	20–20,000 Hz
S/N ratio playback	≥ 86 dBA
Cross talk	≤ -65 dB (1 kHz)
Total harmonic distortion	≤ -81 dB (1 kHz)

Laser (CD recorder)

Type	Semiconductor laser GaAIAs
Wave length	775–795 nm (at 25° C)
Output power	2.5 mW (Read), 35 mW (Write)
Beam divergence	60 degree

Tuner

Wave range	
FM	87.5–108.0 MHz
AM	530–1,700 kHz

Speakers

System	3 way bass reflex
Impedance	6 Ω
Woofer	1 × 6.5"
Tweeter	1 × 2.5", Ferro fluid cooled
Tweeter	1 × 1", Polydome
Dimensions, h × w × d	12.2 × 9.4 × 12.7 in.
Weight	4.6 kg/each

TROUBLESHOOTING

WARNING

Under no circumstances should you try to repair the unit yourself as this will invalidate the guarantee. Do not open the unit as there is a risk of electric shock.

If a fault occurs, first check the points listed, before taking the unit for repair.

If you are unable to solve a problem by following these hints, consult your dealer or service center.

LASER SAFETY

This unit employs a laser. Only a qualified service person should remove the cover or attempt to service this device, due to possible eye injury.

PROBLEM	POSSIBLE CAUSE	SOLUTION
No sound, no power	Volume is not correctly adjusted.	Adjust the volume.
	Headphones are connected.	Disconnect headphones.
	Speakers are wrongly or not connected.	Make sure speakers are properly connected.
	Power cable is not securely connected.	Connect power cable properly.
No reaction to controls	Electrostatic discharge	Disconnect the unit from power supply, then reconnect after a few seconds.
Poor radio reception	Weak radio signal	Direct the antenna for optimum reception.
	Antenna is positioned near a radiation source such as a TV, VCR, computer, etc.	Change the position of the interfering unit or try to switch it off.
Poor bass sound	Speakers are not in phase.	Connect the colored (or marked) wires to the colored terminals and the black (or unmarked) wires to the black terminals.
Bad sound	Badly matched setting for the given type of music or sound.	Correct the sound settings on the unit.
Remote control does not function properly	Batteries are inserted incorrectly.	Insert batteries correctly.
	Batteries are flat.	Insert new batteries.
	Distance to the unit is too large.	Reduce distance.
Insert Disc **indication**	The CD(RW) is scratched badly or dirty.	Replace or clean the disc.
	No CD(RW) inserted or inserted upside down.	Insert a CD(RW), with label facing upwards.
	The laser lens is steamed up.	Wait until the lens has cleared.
Wrong Disc **indication,** Use Audio CD **indication**	No digital audio disc is inserted.	Insert a digital audio disc marked with “Digital Audio” and the special logo.
Disc Recover **indication**	Power loss	Wait a few minutes. The disc is being repaired.
Disc Error **indication**	Disc Recover was not able to repair the disc.	The disc can still be played, but not recorded or finalized further.
Check Input **indication**	Wrong input is chosen.	Select the correct input.
	No correct digital source is detected after starting recording.	Make sure the connection cable is properly connected.
Does not record	CDR(W) is scratched or dirty.	Make sure the CDR(W) is absolutely free of scratches and dust particles.
	The inserted disc is not recordable.	Insert a digital CDR(W) and make sure it is unfinalized.
	Recording process is interrupted (power loss, mechanical shock).	Start recording again.
Recorded disc does not play in another standard CD player	The inserted CDR(W) is not finalized.	Finalize the CDR(W).
	The CDRW is inserted in a non-CDRW compatible CD player.	Insert the CDRW in a CDRW compatible CD player.

Warnings & Safety

(GB) WARNING

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wristband with resistance. Keep components and tools at this potential.

(F) ATTENTION

Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

ESD

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING

Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB) AVAILABLE ESD PROTECTION EQUIPMENT :

anti-static table mat	large 1200x650x1.25mm	4822 466 10953
	small 600x650x1.25mm	4822 466 10958
anti-static wristband		4822 395 10223
connection box (3 press stud connections, 1MΩ)		4822 320 11307
extendible cable (2m, 2MΩ, to connect wristband to connection box)		4822 320 11305
connecting cable (3m, 2MΩ, to connect table mat to connection box)		4822 320 11306
earth cable (1MΩ, to connect any product to mat or to connection box)		4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)		4822 310 10671
wristband tester		4822 344 13999

SAFETY

(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.
Safety components are marked by the symbol ⚠

(F)

Les normes de sécurité exigent que l`appareil soit remis à l`état d`origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués ⚠

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(I)

Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(GB) **DANGER**: Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

CLASS 1
LASER PRODUCT

(S) Varning !

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(DK) Advarsel !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

(FIN) Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

(GB)

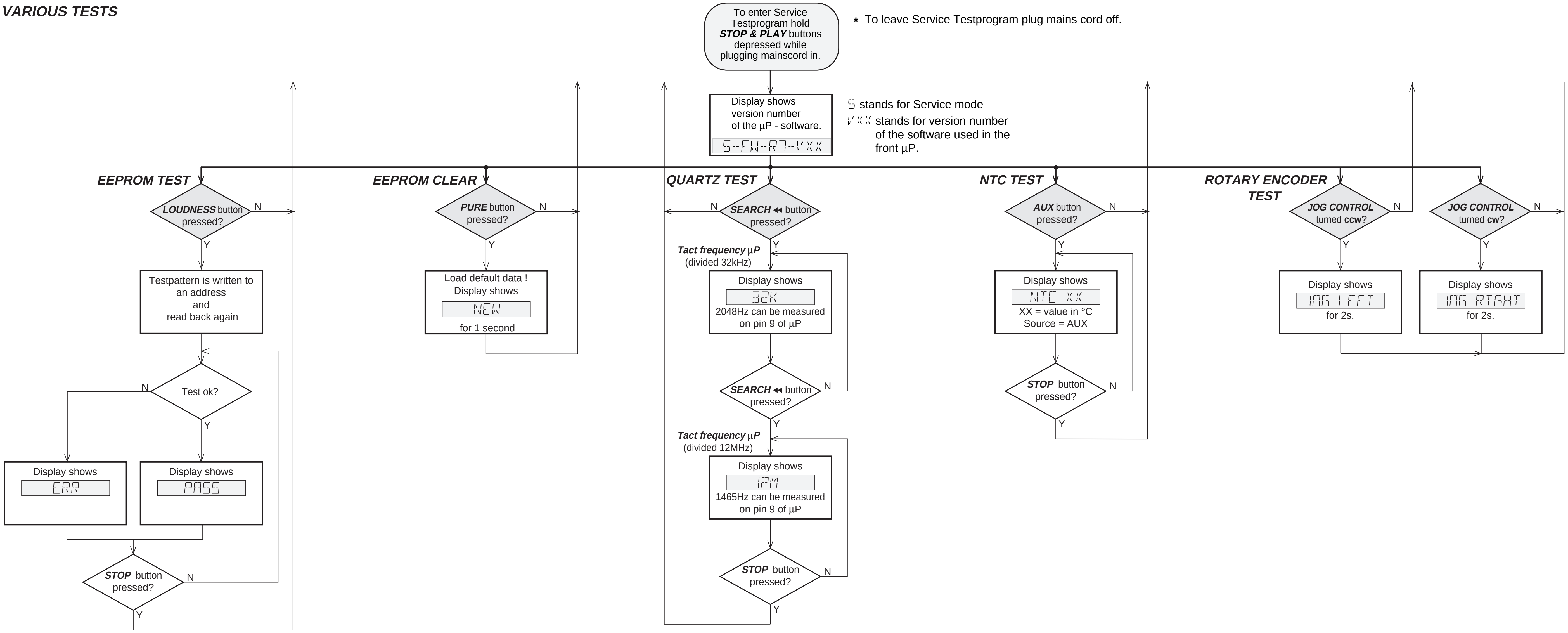
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.
The leakage current must not exceed 0.5mA.

(F)

"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

SERVICE TESTPROGRAM

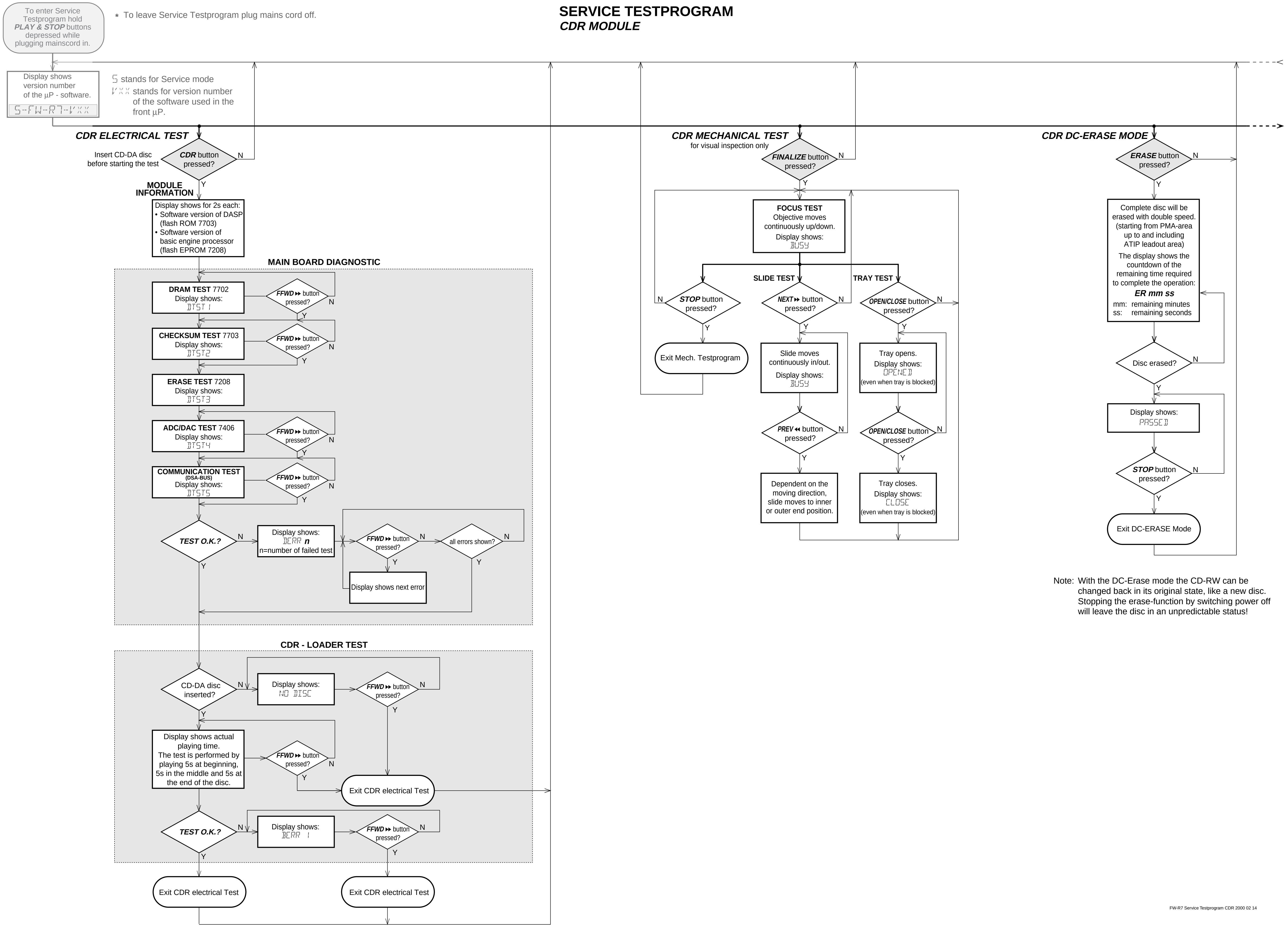
VARIOUS TESTS


To enter Service Testprogram hold **STOP & PLAY** buttons depressed while plugging mainscord in.
* To leave Service Testprogram plug mains cord off.
Display shows version number of the µP - software.
S-FW-R7-VXX
S stands for Service mode
VXX stands for version number of the software used in the front µP.
EEPROM TEST
LOUDNESS button pressed?
N
Y
Testpattern is written to an address and read back again
Test ok?
N
Y
Display shows
ERR
Display shows
PASS
STOP button pressed?
N
Y
EEPROM CLEAR
PURE button pressed?
N
Y
Load default data ! Display shows
NEW
for 1 second
QUARTZ TEST
SEARCH ◂◂ button pressed?
N
Y
Tact frequency µ**P**
(divided 32kHz)
Display shows
32K
2048Hz can be measured on pin 9 of µP
SEARCH ◂◂ button pressed?
N
Y
Tact frequency µ**P**
(divided 12MHz)
Display shows
12M
1465Hz can be measured on pin 9 of µP
STOP button pressed?
N
Y
NTC TEST
AUX button pressed?
N
Y
Display shows
NTC XX
XX = value in °C
Source = AUX
STOP button pressed?
N
Y
ROTARY ENCODER TEST
JOG CONTROL turned **ccw**?
N
Y
Display shows
JOG LEFT
for 2s.
JOG CONTROL turned **cw**?
N
Y
Display shows
JOG RIGHT
for 2s.

SERVICE TESTPROGRAM

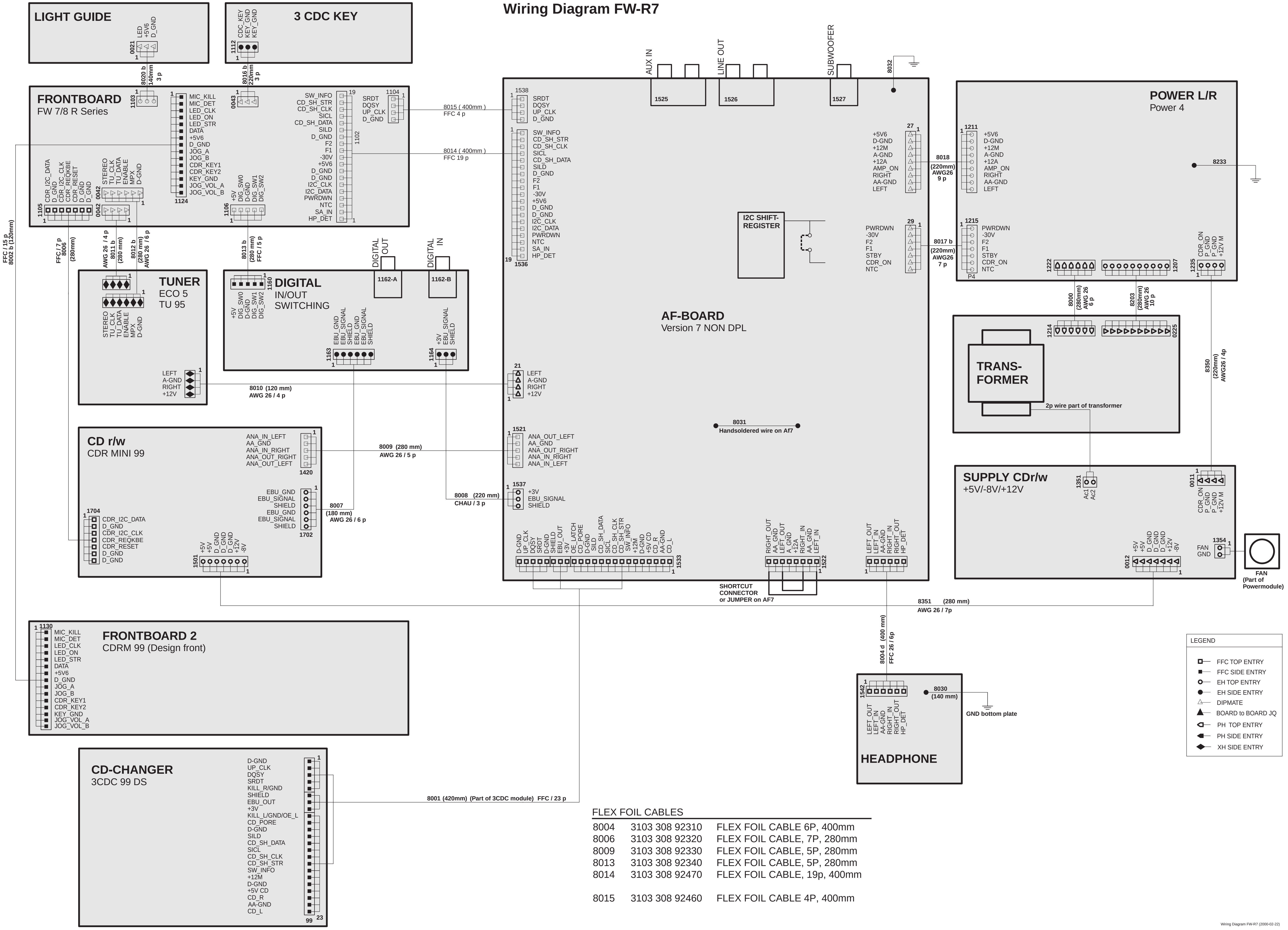
CDR MODULE

* To leave Service Testprogram plug mains cord off.


To enter Service Testprogram hold PLAY & STOP buttons depressed while plugging mainscord in.
Display shows version number of the µP - software.
S-FW-R7-VXX
S stands for Service mode
VXX stands for version number of the software used in the front µP.
CDR ELECTRICAL TEST
Insert CD-DA disc before starting the test
CDR button pressed?
N
Y
MODULE INFORMATION
Display shows for 2s each:
• Software version of DASP (flash ROM 7703)
• Software version of basic engine processor (flash EPROM 7208)
MAIN BOARD DIAGNOSTIC
DRAM TEST 7702
Display shows:
DTST 1
FFWD ▸▸ button pressed?
CHECKSUM TEST 7703
Display shows:
DTST2
ERASE TEST 7208
Display shows:
DTST3
ADC/DAC TEST 7406
Display shows:
DTST4
COMMUNICATION TEST (DSA-BUS)
Display shows:
DTST5
TEST O.K.?
Display shows:
DERR n
n=number of failed test
all errors shown?
Display shows next error
CDR - LOADER TEST
CD-DA disc inserted?
Display shows:
NO DISC
Display shows actual playing time. The test is performed by playing 5s at beginning, 5s in the middle and 5s at the end of the disc.
Exit CDR electrical Test
Display shows:
DERR 1
Exit CDR electrical Test
Exit CDR electrical Test
CDR MECHANICAL TEST
for visual inspection only
FINALIZE button pressed?
FOCUS TEST
Objective moves continuously up/down.
Display shows:
BUSY
SLIDE TEST
TRAY TEST
STOP button pressed?
NEXT ▸▸ button pressed?
OPEN/CLOSE button pressed?
Exit Mech. Testprogram
Slide moves continuously in/out.
Display shows:
BUSY
Tray opens.
Display shows:
OPENED
(even when tray is blocked)
PREV ◂◂ button pressed?
OPEN/CLOSE button pressed?
Dependent on the moving direction, slide moves to inner or outer end position.
Tray closes.
Display shows:
CLOSE
(even when tray is blocked)
CDR DC-ERASE MODE
ERASE button pressed?
Complete disc will be erased with double speed. (starting from PMA-area up to and including ATIP leadout area)
The display shows the countdown of the remaining time required to complete the operation:
ER mm ss
mm: remaining minutes
ss: remaining seconds
Disc erased?
Display shows:
PASSED
STOP button pressed?
Exit DC-ERASE Mode

Note: With the DC-Erase mode the CD-RW can be changed back in its original state, like a new disc. Stopping the erase-function by switching power off will leave the disc in an unpredictable status!

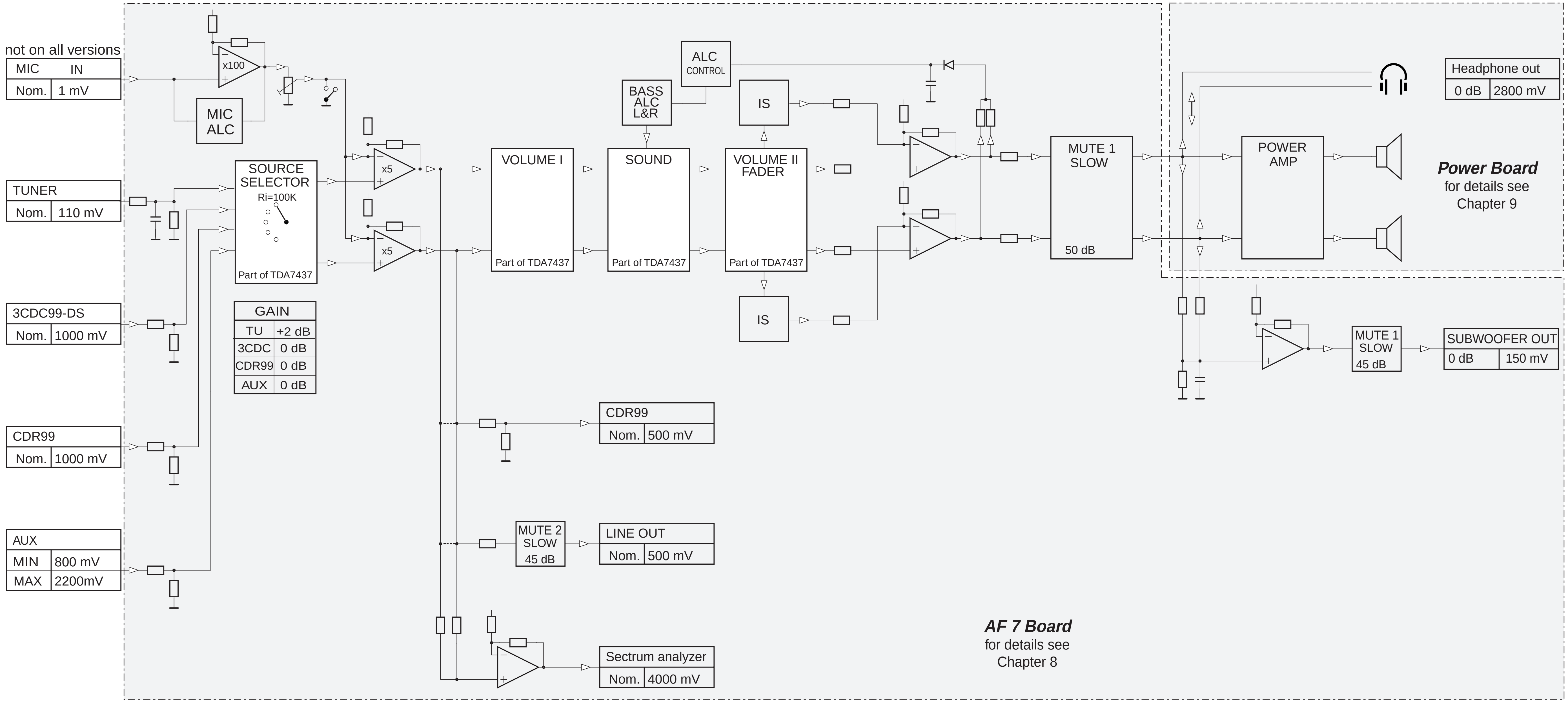
Wiring Diagram FW-R7

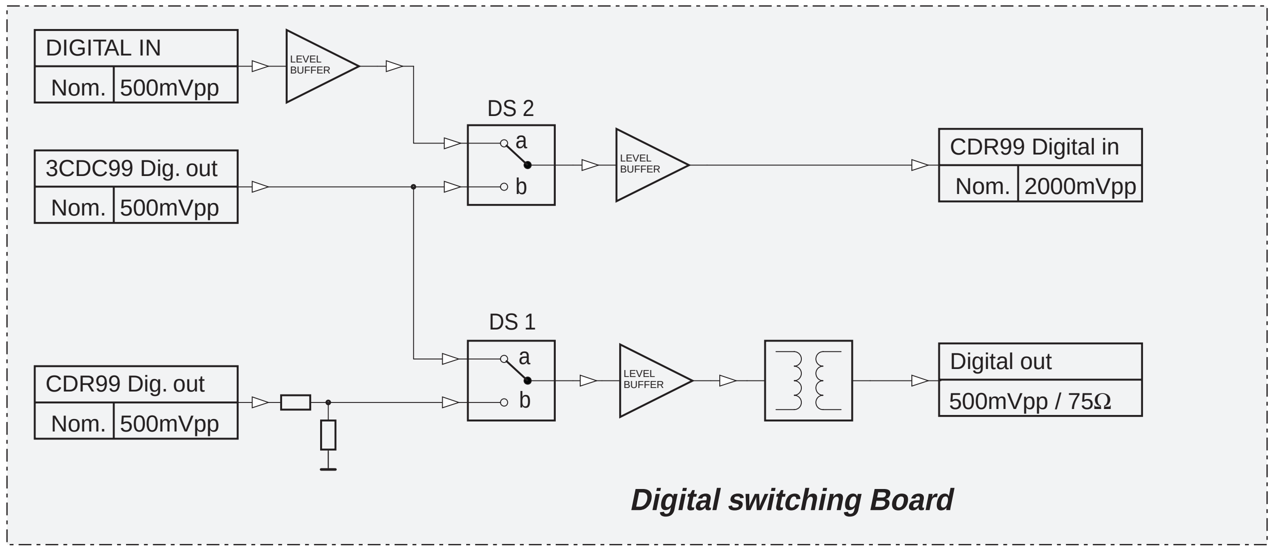

LIGHT GUIDE
0021 LED +5V6 D_GND
3 CDC KEY
1112 CDC_KEY KEY_GND KEY_GND
8020 b 140mm 3 p
8016 b 220mm 3 p
FRONTBOARD
FW 7/8 R Series
1103
1124 MIC_KILL MIC_DET LED_CLK LED_ON LED_STR DATA +5V6 D_GND JOG_A JOG_B CDR_KEY1 CDR_KEY2 KEY_GND JOG_VOL_A JOG_VOL_B
0043
1102 SW_INFO CD_SH_STR CD_SH_CLK SICL CD_SH_DATA SILD D_GND F2 F1 -30V +5V6 D_GND D_GND I2C_CLK I2C_DATA PWRDWN NTC SA_IN HP_DET
1104 SRDT DQSY UP_CLK D_GND
1105 CDR_I2C_DATA D_GND CDR_I2C_CLK CDR_REQKBE CDR_RESET D_GND D_GND
0042 STEREO TU_CLK TU_DATA ENABLE MPX D-GND
1106 +5V DIG_SW0 D_GND DIG_SW1 DIG_SW2
8015 (400mm) FFC 4 p
8014 (400mm) FFC 19 p
FFC / 15 p 8002 b (120mm)
FFC / 7 p 8006 (280mm)
AWG 26 / 4 p 8011 b (280 mm)
8012 b (280 mm) AWG 26 / 6 p
8013 b (280 mm) FFC / 5 p
TUNER
ECO 5
TU 95
STEREO TU_CLK TU_DATA ENABLE MPX D-GND
LEFT A-GND RIGHT +12V
DIGITAL
IN/OUT
SWITCHING
1160 +5V DIG_SW0 D-GND DIG_SW1 DIG_SW2
DIGITAL OUT 1162-A
DIGITAL IN 1162-B
1163 EBU_GND EBU_SIGNAL SHIELD EBU_GND EBU_SIGNAL SHIELD
1164 +3V EBU_SIGNAL SHIELD
8010 (120 mm) AWG 26 / 4 p
CD r/w
CDR MINI 99
1420 ANA_IN_LEFT AA_GND ANA_IN_RIGHT ANA_OUT_RIGHT ANA_OUT_LEFT
8009 (280 mm) AWG 26 / 5 p
1702 EBU_GND EBU_SIGNAL SHIELD EBU_GND EBU_SIGNAL SHIELD
8007 (180 mm) AWG 26 / 6 p
8008 (220 mm) CHAU / 3 p
1704 CDR_I2C_DATA D_GND CDR_I2C_CLK CDR_REQKBE CDR_RESET D_GND D_GND
1501 +5V +5V D_GND D_GND D_GND +12V -8V
AUX IN 1525
LINE OUT 1526
SUBWOOFER 1527
8032
1538 SRDT DQSY UP_CLK D_GND
1536 SW_INFO CD_SH_STR CD_SH_CLK SICL CD_SH_DATA SILD D_GND F2 F1 -30V +5V6 D_GND D_GND I2C_CLK I2C_DATA PWRDWN NTC SA_IN HP_DET
I2C SHIFT-REGISTER
27 +5V6 D-GND +12M A-GND +12A AMP_ON RIGHT AA-GND LEFT
29 PWRDWN -30V F2 F1 STBY CDR_ON NTC
8018 (220mm) AWG26 9 p
8017 b (220mm) AWG26 7 p
AF-BOARD
Version 7 NON DPL
21 LEFT A-GND RIGHT +12V
8031 Handsoldered wire on Af7
1521 ANA_OUT_LEFT AA_GND ANA_OUT_RIGHT ANA_IN_RIGHT ANA_IN_LEFT
1537 +3V EBU_SIGNAL SHIELD
1533 D-GND UP_CLK DQSY SRDT D-GND SHIELD EBU_OUT +3V OE_LATCH CD_PORE D-GND SILD CD_SH_DATA SICL CD_SH_CLK CD_SH_STR SW_INFO +12M D-GND +5V CD CD_R AA-GND CD_L
1522 RIGHT_OUT AA_GND LEFT_OUT A_GND +12A RIGHT_IN AA_GND LEFT_IN
LEFT_OUT LEFT_IN AA-GND RIGHT_IN RIGHT_OUT HP_DET
SHORTCUT CONNECTOR or JUMPER on AF7
POWER L/R
Power 4
1211 +5V6 D-GND +12M A-GND +12A AMP_ON RIGHT AA-GND LEFT
8233
1215 PWRDWN -30V F2 F1 STBY CDR_ON NTC
P4
1222
1207
1235 CDR_ON P_GND P_GND +12V M
8000 (280mm) AWG 26 6 p
8203 (280mm) AWG 26 10 p
1214
0225
TRANS-FORMER
2p wire part of transformer
8350 (220mm) AWG26 / 4p
SUPPLY CDr/w
+5V/-8V/+12V
1351 Ac1 Ac2
0011 CDR_ON P_GND P_GND +12V M
0012 +5V +5V D_GND D_GND D_GND +12V -8V
1354 FAN GND
FAN (Part of Powermodule)
8351 (280 mm) AWG 26 / 7p
8004 d (400 mm) FFC 26 / 6p
1542 LEFT_OUT LEFT_IN AA-GND RIGHT_IN RIGHT_OUT HP_DET
8030 (140 mm)
GND bottom plate
HEADPHONE
FRONTBOARD 2
CDRM 99 (Design front)
1130 MIC_KILL MIC_DET LED_CLK LED_ON LED_STR DATA +5V6 D_GND JOG_A JOG_B CDR_KEY1 CDR_KEY2 KEY_GND JOG_VOL_A JOG_VOL_B
CD-CHANGER
3CDC 99 DS
D-GND UP_CLK DQSY SRDT KILL_R/GND SHIELD EBU_OUT +3V KILL_L/GND/OE_L CD_PORE D-GND SILD CD_SH_DATA SICL CD_SH_CLK CD_SH_STR SW_INFO +12M D-GND +5V CD CD_R AA-GND CD_L
99 23
8001 (420mm) (Part of 3CDC module) FFC / 23 p
LEGEND
FFC TOP ENTRY
FFC SIDE ENTRY
EH TOP ENTRY
EH SIDE ENTRY
DIPMATE
BOARD to BOARD JQ
PH TOP ENTRY
PH SIDE ENTRY
XH SIDE ENTRY

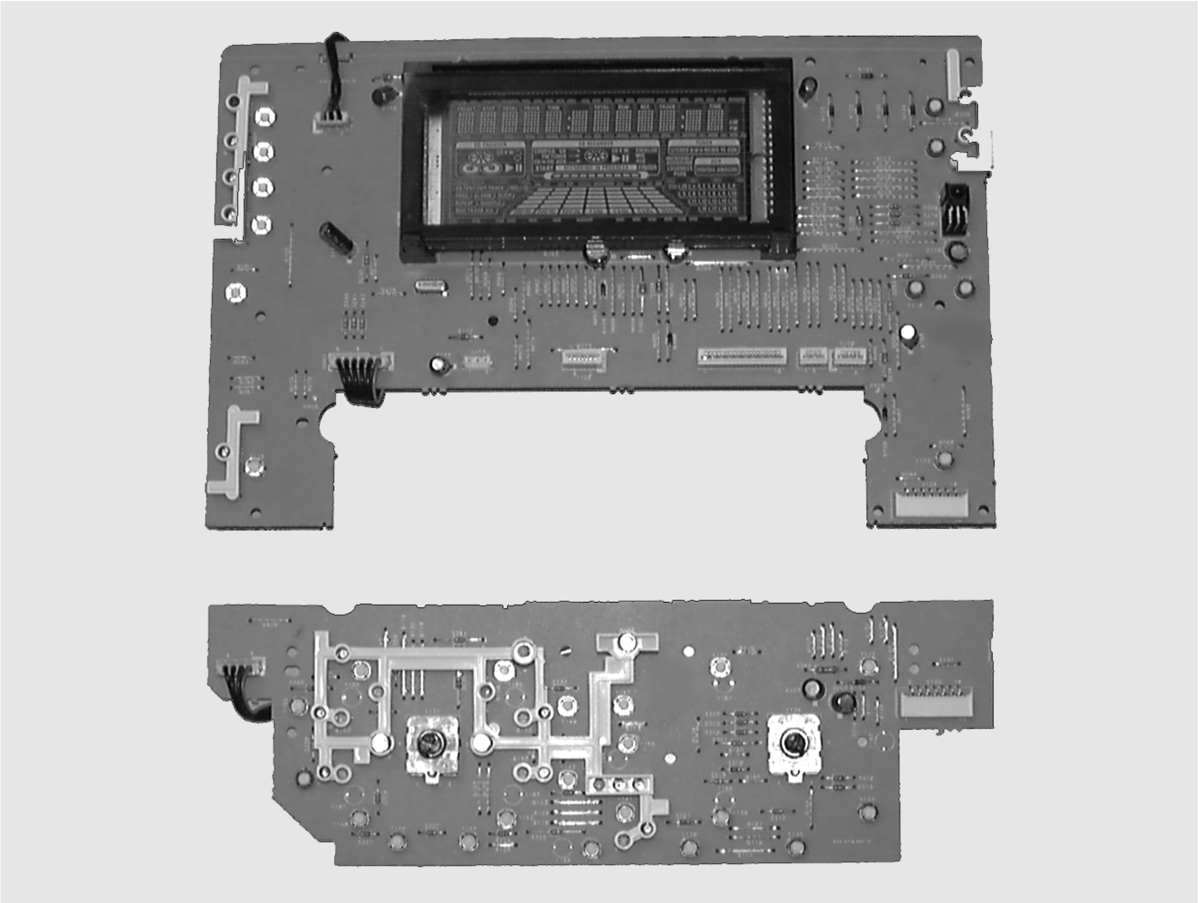
FLEX FOIL CABLES

8004	3103 308 92310	FLEX FOIL CABLE 6P, 400mm
8006	3103 308 92320	FLEX FOIL CABLE, 7P, 280mm
8009	3103 308 92330	FLEX FOIL CABLE, 5P, 280mm
8013	3103 308 92340	FLEX FOIL CABLE, 5P, 280mm
8014	3103 308 92470	FLEX FOIL CABLE, 19p, 400mm
8015	3103 308 92460	FLEX FOIL CABLE 4P, 400mm

Block / Leveldiagram


not on all versions
MIC IN
Nom. 1 mV
x100
MIC ALC
TUNER
Nom. 110 mV
3CDC99-DS
Nom. 1000 mV
CDR99
Nom. 1000 mV
AUX
MIN 800 mV
MAX 2200mV
SOURCE SELECTOR
Ri=100K
Part of TDA7437
GAIN
TU +2 dB
3CDC 0 dB
CDR99 0 dB
AUX 0 dB
x5
x5
VOLUME I
Part of TDA7437
BASS ALC L&R
ALC CONTROL
SOUND
Part of TDA7437
IS
VOLUME II FADER
Part of TDA7437
IS
MUTE 1 SLOW
50 dB
POWER AMP
Headphone out
0 dB 2800 mV
Power Board
for details see Chapter 9
MUTE 1 SLOW
45 dB
SUBWOOFER OUT
0 dB 150 mV
CDR99
Nom. 500 mV
MUTE 2 SLOW
45 dB
LINE OUT
Nom. 500 mV
Sectrum analyzer
Nom. 4000 mV
AF 7 Board
for details see Chapter 8


DIGITAL IN
Nom. 500mVpp
LEVEL BUFFER
DS 2
a
b
3CDC99 Dig. out
Nom. 500mVpp
LEVEL BUFFER
CDR99 Digital in
Nom. 2000mVpp
DS 1
a
b
CDR99 Dig. out
Nom. 500mVpp
LEVEL BUFFER
Digital out
500mVpp / 75Ω
Digital switching Board



Front Board

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3CDC-Key Board

Circuit Diagram 6-1

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Circuit Diagram 6-3

Technical Front Board

Component Layout Copperside view 6-4

Circuit Diagram 6-5

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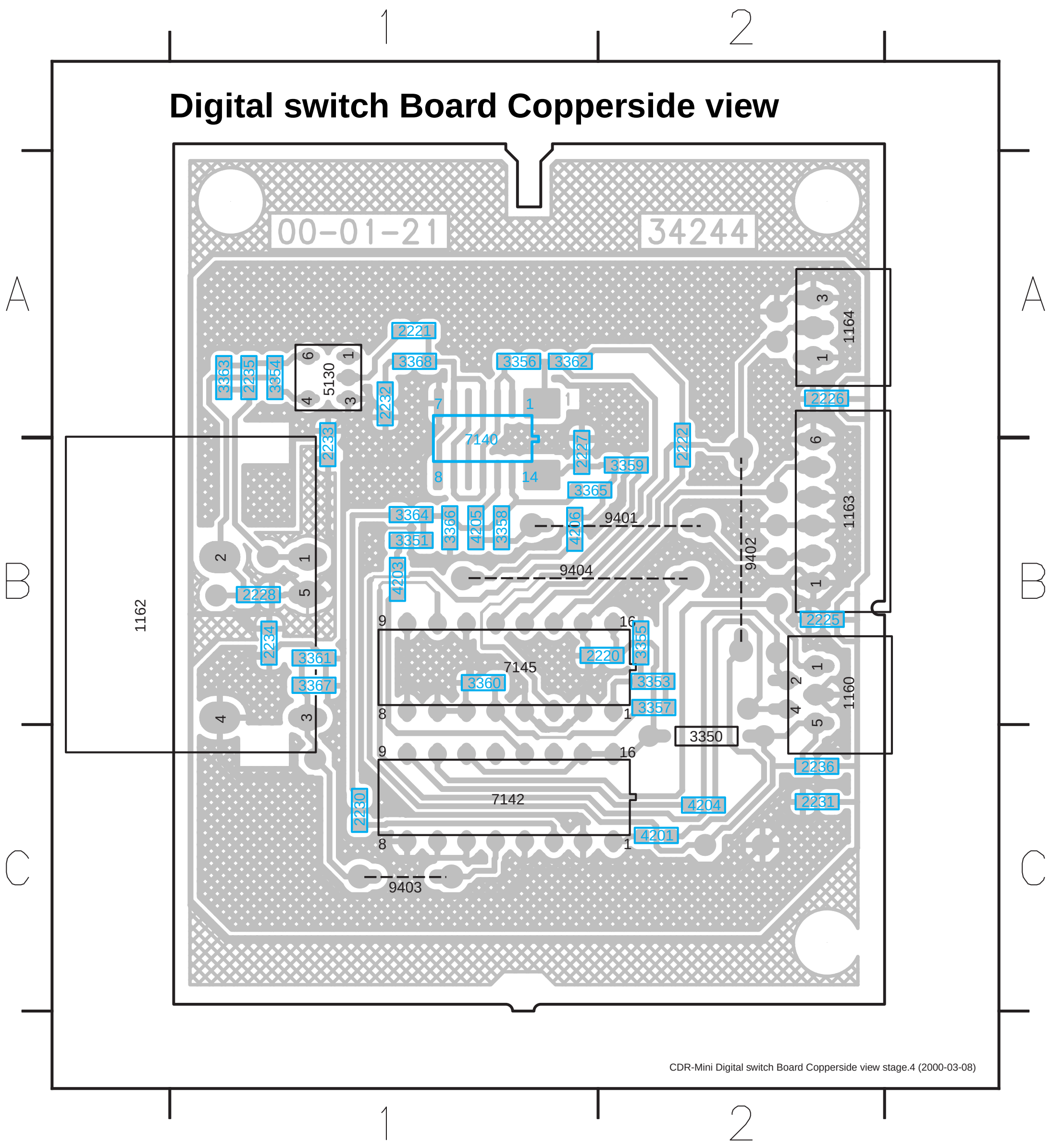
Design Front Board

Component Layout...6-8

Circuit Diagram 6-9

Electrical Partslist 6-10

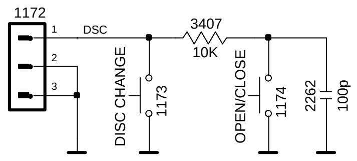
Digital switch Board Copperside view


1
2
A
B
C
00-01-21
34244
1160
1162
1163
1164
5130
7140
7142
7145
9401
9402
9403
9404
3350

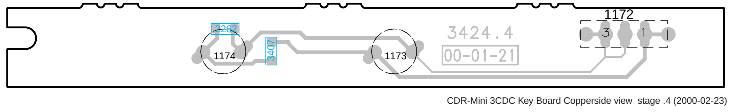
CDR-Mini Digital switch Board Copperside view stage.4 (2000-03-08)

1160	B2	4204	C2
1162	B1	4205	B1
1163	B2	4206	B1
1164	A2	5130	A1
2220	B2	7140	B1
2221	A1	7142	C1
2222	B2	7145	B1
2225	B2	9401	B2
2226	A2	9402	B2
2227	A2	9403	C1
2228	B1	9404	B1
2230	C1		
2231	C2		
2232	A1		
2233	B1		
2234	B1		
2235	A1		
2236	C2		
3350	C2		
3351	B1		
3353	B2		
3354	A1		
3355	B2		
3356	A1		
3357	B2		
3358	B1		
3359	B2		
3360	B1		
3361	B1		
3362	A1		
3363	A1		
3364	B1		
3365	B1		
3366	B1		
3367	B1		
3368	A1		
4201	C2		
4203	B1		

3 CDC-Key

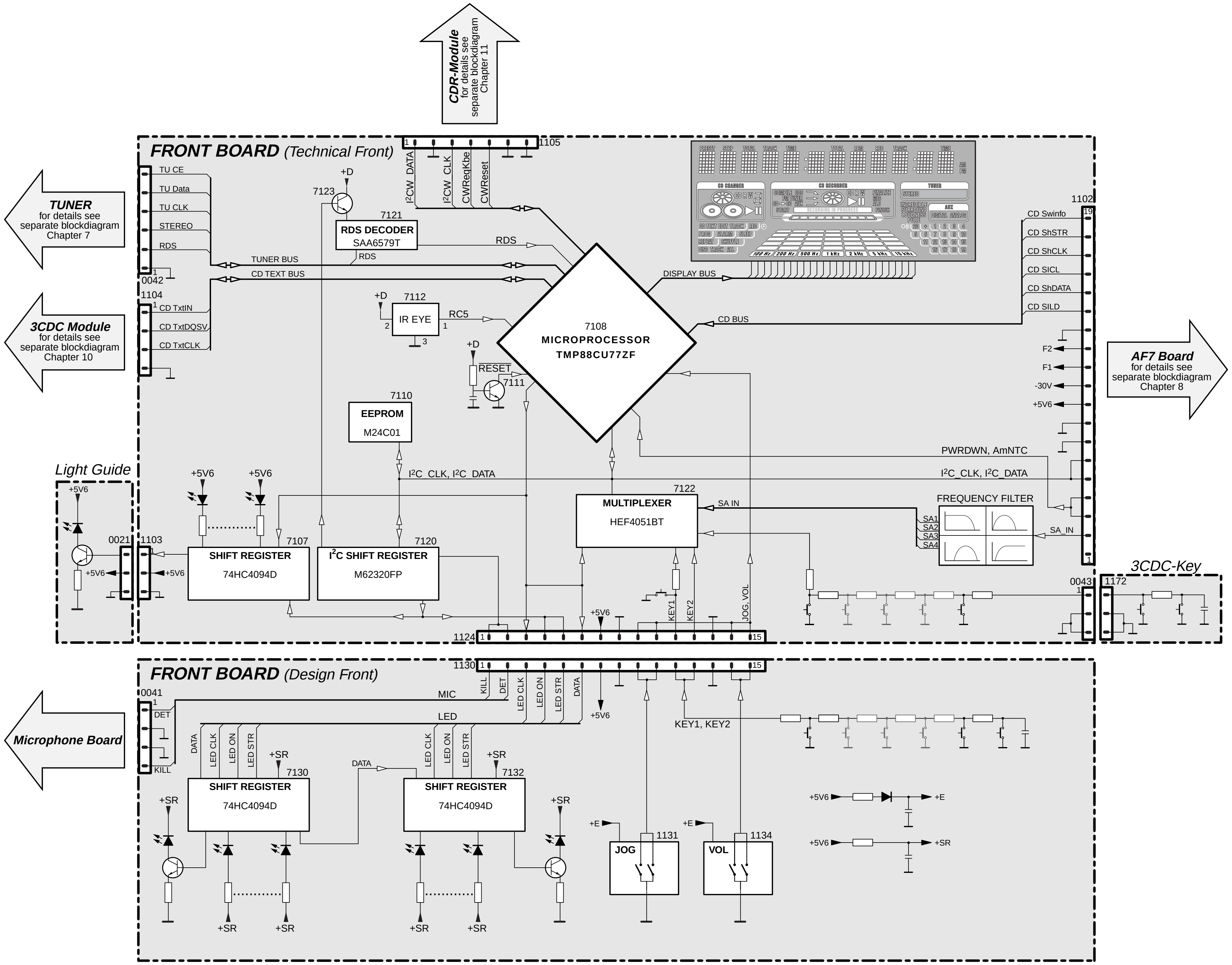

1172
1
2
3
DSC
3407
10K
DISC CHANGE
1173
OPEN/CLOSE
1174
2262
100p

3CDC Key Board Copperside view

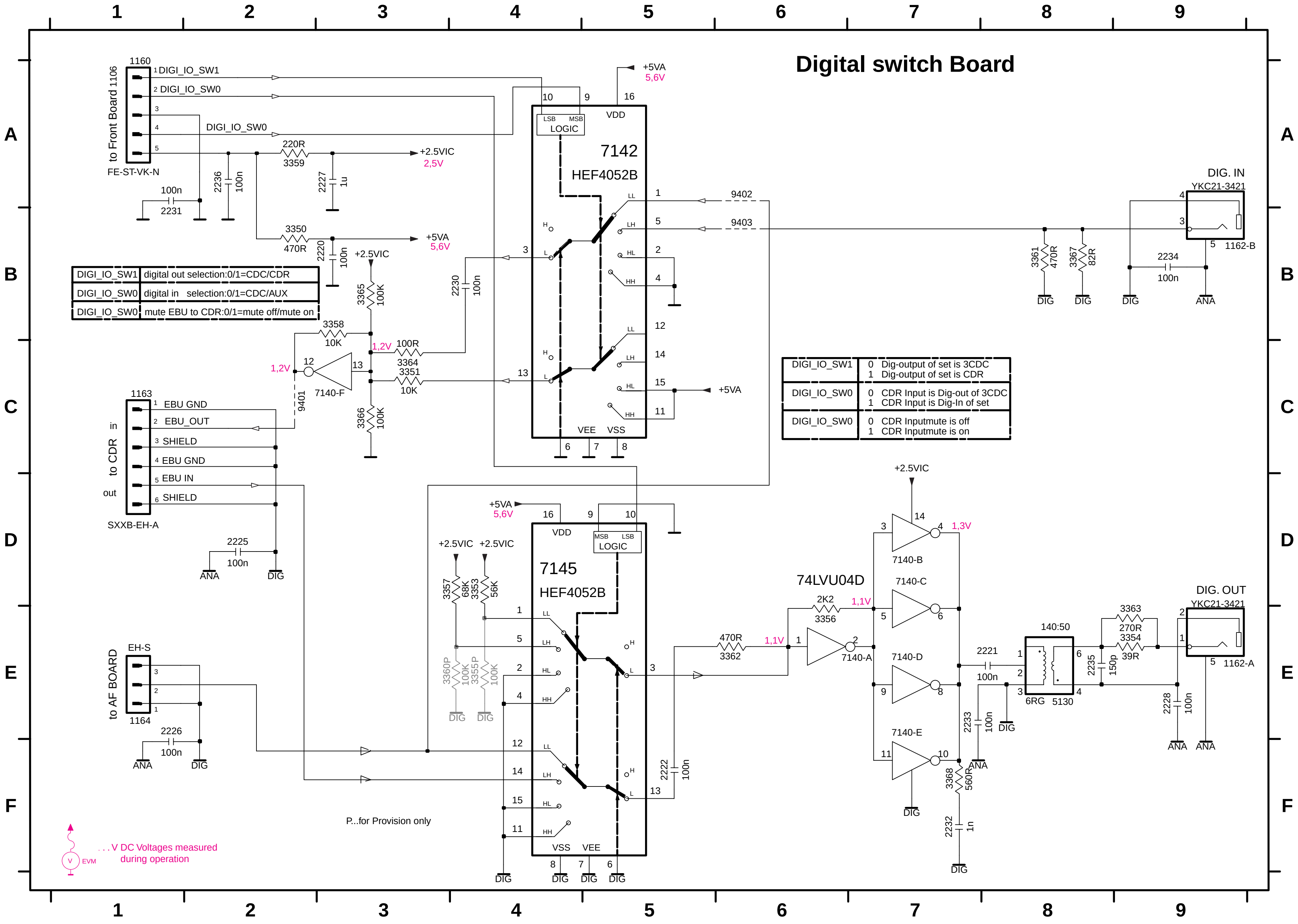

1172
1174
1173
3424.4
00-01-21

CDR-Mini 3CDC Key Board Copperside view stage .4 (2000-02-23)

Blockdiagram


CDR-Module
for details see separate blockdiagram Chapter 11
FRONT BOARD (Technical Front)
1105
I2CW_DATA
I2CW_CLK
CWReqKbe
CWReset
TUNER
for details see separate blockdiagram Chapter 7
TU CE
TU Data
TU CLK
STEREO
RDS
0042
1104
TUNER BUS
CD TEXT BUS
3CDC Module
for details see separate blockdiagram Chapter 10
CD TxtIN
CD TxtDQSV
CD TxtCLK
+D
7123
7121
RDS DECODER
SAA6579T
RDS
7112
IR EYE
RC5
7108
MICROPROCESSOR
TMP88CU77ZF
RESET
7111
DISPLAY BUS
CD BUS
1102
CD Swinfo
CD ShSTR
CD ShCLK
CD SICL
CD ShDATA
CD SILD
F2
F1
-30V
+5V6
AF7 Board
for details see separate blockdiagram Chapter 8
7110
EEPROM
M24C01
PWRDWN, AmNTC
I2C_CLK, I2C_DATA
7122
MULTIPLEXER
HEF4051BT
SA IN
FREQUENCY FILTER
SA1
SA2
SA3
SA4
SA_IN
Light Guide
+5V6
0021
1103
7107
SHIFT REGISTER
74HC4094D
7120
I2C SHIFT REGISTER
M62320FP
KEY1
KEY2
JOG_VOL
3CDC-Key
0043
1172
1124
1130
FRONT BOARD (Design Front)
0041
DET
KILL
MIC
LED
DET
LED CLK
LED ON
LED STR
DATA
KEY1, KEY2
Microphone Board
+SR
7130
SHIFT REGISTER
74HC4094D
DATA
7132
SHIFT REGISTER
74HC4094D
+E
1131
JOG
1134
VOL
+5V6
+E
+SR

Digital switch Board


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
1160
DIGI_IO_SW1
DIGI_IO_SW0
DIGI_IO_SW0
to Front Board 1106
FE-ST-VK-N
220R
3359
+2.5VIC
2,5V
2236
100n
2227
1u
100n
2231
3350
470R
2220
100n
+5VA
5,6V
+2.5VIC
3365
100K
3358
10K
1,2V
12
13
7140-F
9401
100R
3364
3351
10K
3366
100K
2230
100n
+5VA
5,6V
10
9
16
VDD
LSB
MSB
LOGIC
7142
HEF4052B
LL
LH
HL
HH
VEE
VSS
+5VA
9402
9403
DIG. IN
YKC21-3421
1162-B
3361
470R
3367
82R
2234
100n
DIG
ANA
1163
EBU GND
EBU_OUT
SHIELD
EBU GND
EBU IN
SHIELD
to CDR
in
out
SXXB-EH-A
2225
100n
+2.5VIC
7140-B
1,3V
7140-C
74LVU04D
2K2
3356
1,1V
7140-A
7140-D
7140-E
3368
560R
2232
1n
2233
100n
+5VA
5,6V
7145
HEF4052B
3357
68K
3353
56K
3360P
100K
3355P
100K
EH-S
to AF BOARD
1164
2226
100n
470R
3362
2222
100n
2221
100n
140:50
6RG
5130
2235
150p
3363
270R
3354
39R
2228
100n
DIG. OUT
YKC21-3421
1162-A
EVM

DIGI_IO_SW1	digital out selection:0/1=CDC/CDR
DIGI_IO_SW0	digital in selection:0/1=CDC/AUX
DIGI_IO_SW0	mute EBU to CDR:0/1=mute off/mute on

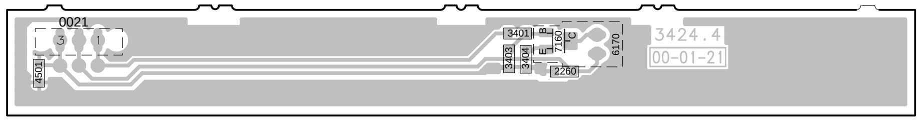
DIGI_IO_SW1	0 Dig-output of set is 3CDC 1 Dig-output of set is CDR
DIGI_IO_SW0	0 CDR Input is Dig-out of 3CDC 1 CDR Input is Dig-In of set
DIGI_IO_SW0	0 CDR Inputmute is off 1 CDR Inputmute is on

P...for Provision only

. . V DC Voltages measured during operation

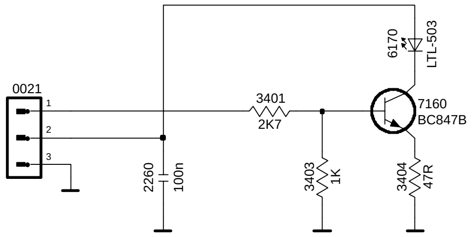
1160 A1
1162-A E9
1162-B B9
1163 C1
1164 E1
2220 B3
2221 E8
2222 F5
2225 D2
2226 E1
2227 A3
2228 E9
2230 B4
2231 B1
2232 F7
2233 E7
2234 B9
2235 E8
2236 A2
3350 B2
3351 C3
3353 D4
3354 E9
3355 E4
3356 E6
3357 D3
3358 B3
3359 A2
3360 E3
3361 B8
3362 E6
3363 E9
3364 C3
3365 B3
3366 C3
3367 B8
3368 F7
5130 E8
7140-A E6
7140-B D7
7140-C D7
7140-D E7
7140-E E7
7140-F C3
7142 A5
7145 D4
9401 C2
9402 A6
9403 B6
F600 A2
F601 A2
F602 E9
F603 A2
F604 E9
F605 A1
F606 A2
F607 C2
F608 B9
F609 D2
F610 E1
F611 E1
F612 E1

Light Guide Copperside view


0021
3401
3403
3404
7160
2260
6170
3424.4
00-01-21

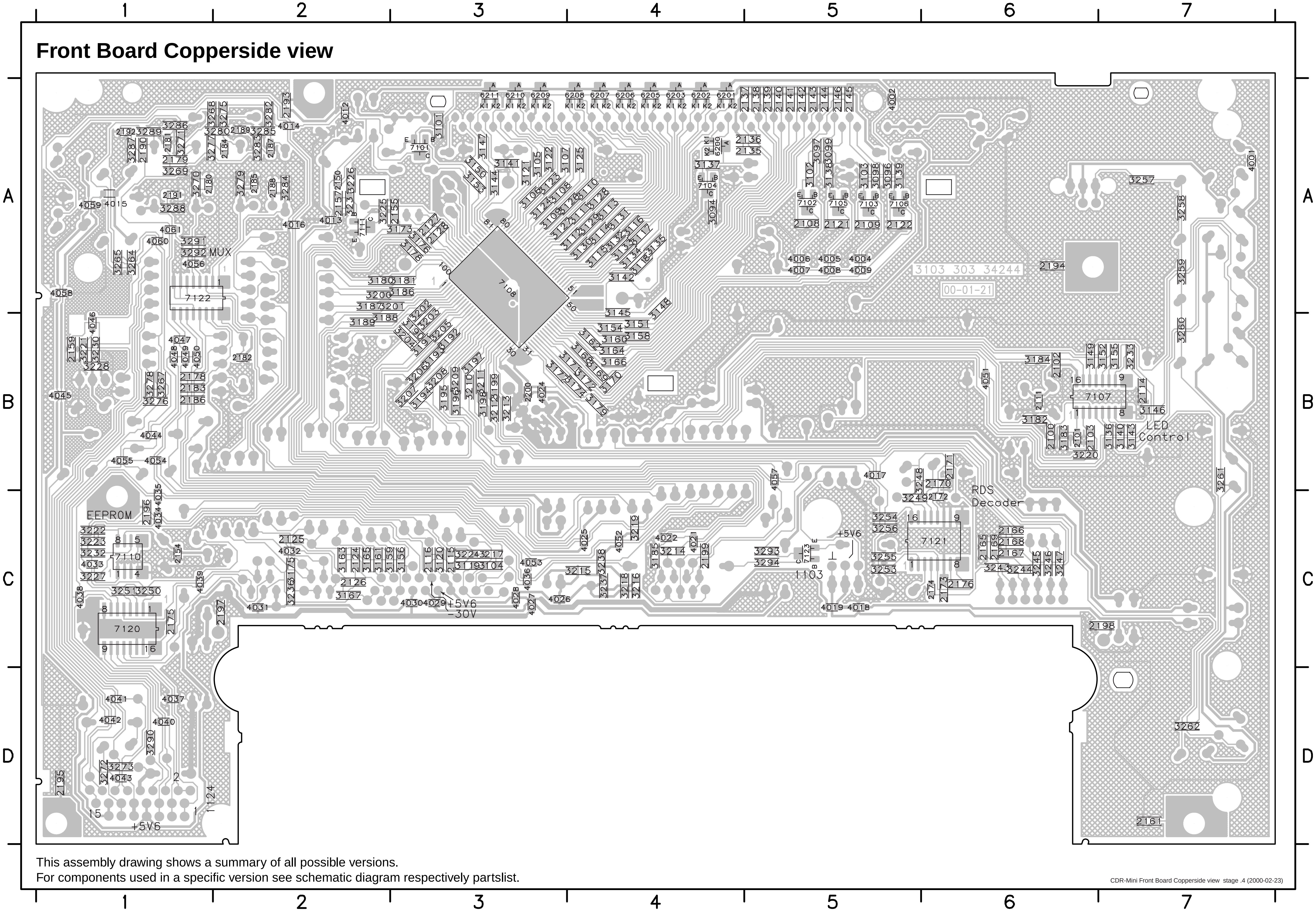
CDR-Mini LED Board Copperside view stage .4 (2000-02-23)

Light Guide Board


0021
6170
LTL-503
3401
2K7
7160
BC847B
2260
100n
3403
1K
3404
47R

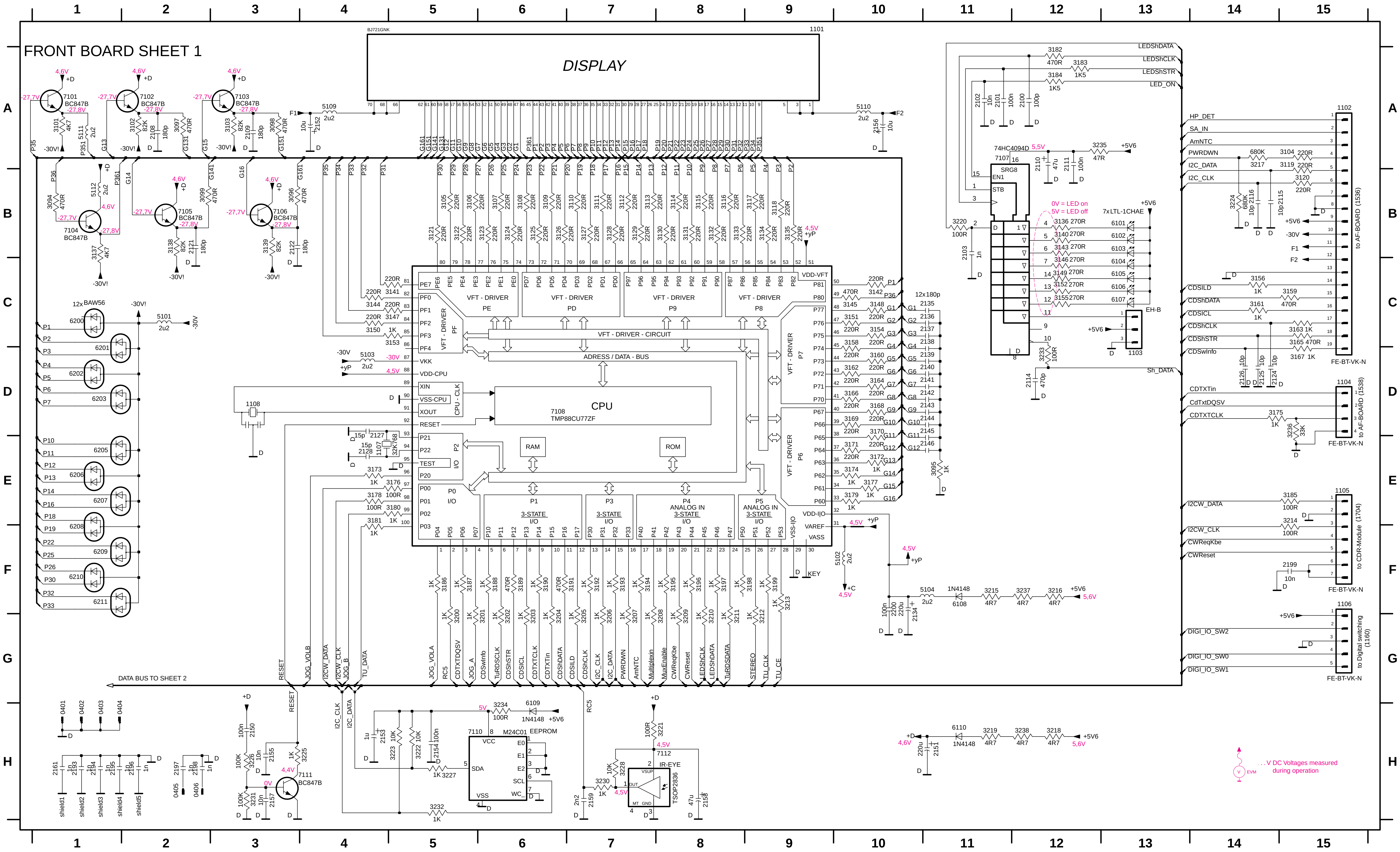
2100	B6
2101	B6
2102	B6
2103	B6
2108	A5
2109	A5
2111	B6
2114	B7
2115	C3
2116	C3
2121	A5
2122	A5
2124	C2
2125	C2
2126	C2
2127	A3
2128	A3
2135	A5
2136	A5
2137	A5
2138	A5
2139	A5
2140	A5
2141	A5
2142	A5
2143	A5
2144	A5
2145	A5
2146	A5
2150	A2
2154	C1
2155	A3
2157	A2
2159	B1
2161	D7
2165	C6
2166	C6
2167	C6
2168	C6
2169	C6
2170	B6
2171	B6
2172	C6
2173	C6
2174	C6
2175	C1
2176	C6
2178	B1
2179	A1
2180	A1
2181	A1
2182	B2
2183	B1
2184	A2
2185	A2
2186	B1
2187	A2
2188	A2
2189	A2
2190	A1
2191	A1
2192	A1
2193	A2
2194	A6
2195	D1
2196	C1
2197	C2
2198	C7
2199	C4
2200	B3
3094	A4
3096	A5
3097	A5
3098	A5
3099	A5
3101	A3
3102	A5
3103	A5
3104	C3
3105	A3
3106	A3
3107	A3
3108	A3
3109	A3
3110	A4
3111	A4
3112	A4
3113	A4
3114	A4
3115	A4
3116	A4
3117	A4
3118	A4
3119	C3
3120	C3
3121	A3
3122	A3
3123	A3
3124	A3
3125	A4
3126	A4
3127	A3
3128	A4
3129	A4
3130	A4
3131	A4
3132	A4
3133	A4
3134	A4
3135	A4
3136	B7
3137	A4
3138	A5
3139	A5
3140	B7
3141	A3
3142	A4
3143	B7
3144	A3
3145	A4
3146	B7
3147	A3
3148	A4
3149	B6
3150	A3
3151	B4
3152	B7
3153	A3
3154	B4
3155	B7
3156	C3
3158	B4
3159	C2
3160	B4
3161	C2
3162	B4
3163	C2
3164	B4
3165	C2
3166	B4
3167	C2
3168	B4
3169	B4
3170	B4
3171	B4
3172	B4
3173	A3
3174	B4
3175	C2
3176	A3
3177	B3
3178	A3
3179	B4
3180	A2
3181	A3
3182	B6
3183	B6
3184	B6
3185	C4
3186	A3
3187	A2
3188	B2
3189	B2
3190	B3
3191	B3
3192	B3
3193	B3
3194	B3
3195	B3
3196	B3
3197	B3
3198	B3
3199	B3
3200	A2
3201	A3
3202	A3
3203	B3
3204	B3
3205	B3
3206	B3
3207	B3
3208	B3
3209	B3
3210	B3
3211	B3
3212	B3
3213	B3
3214	C4
3215	C4
3216	C4
3217	C3
3218	C4
3219	C4
3220	B6
3221	B1
3222	C1
3223	C1
3224	C3
3225	A2
3226	A2
3227	C1
3228	B1
3230	B1
3231	A2
3232	C1
3233	B7
3236	C2
3237	C4
3238	C4
3243	C6
3244	C6
3245	C6
3246	C6
3247	C6
3248	B5
3249	C5
3250	C1
3251	C1
3253	C5
3254	C5
3255	C5
3256	C5
3257	A7
3258	A7
3259	A7
3260	B7
3261	B7
3262	D7
3264	A1
3265	A1
3267	B1
3268	A1
3269	A1
3270	A1
3271	A1
3272	D1
3273	D1
3275	A2
3276	B1
3277	A1
3278	B1
3279	A2
3280	A2
3282	A2
3283	A2
3284	A2
3285	A2
3286	A1
3287	A1
3288	A1
3289	A1
3290	D1
3291	A1
3292	A1
3293	C5
3294	C5
4001	A7
4002	A5
4004	A5
4005	A5
4006	A5
4007	A5
4008	A5
4009	A5
4012	A2
4013	A2
4014	A2
4015	A1
4016	A2
4017	B5
4018	C5
4019	C5
4021	C4
4022	C4
4024	B3
4025	C4
4026	C3
4027	C3
4028	C3
4029	C3
4030	C3
4031	C2
4032	C2
4033	C1
4034	C1
4035	C1
4036	C3
4037	D1
4038	C1
4039	C1
4040	D1
4041	D1
4042	D1
4043	D1
4044	B1
4045	B1
4046	B1
4047	B1
4048	B1
4049	B1
4050	B1
4051	B6
4052	C4
4053	C3
4054	B1
4055	B1
4056	A1
4057	B5
4058	A1
4059	A1
4060	A1
4061	A1
6200	A4
6201	A4
6202	A4
6203	A4
6205	A4
6206	A4
6207	A4
6208	A4
6209	A3
6210	A3
6211	A3
7101	A3
7102	A5
7103	A5
7104	A4
7105	A5
7106	A5
7107	B6
7108	A3
7110	C1
7111	A2
7120	C1
7121	C6
7122	A1
7123	C5

Front Board Copperside view

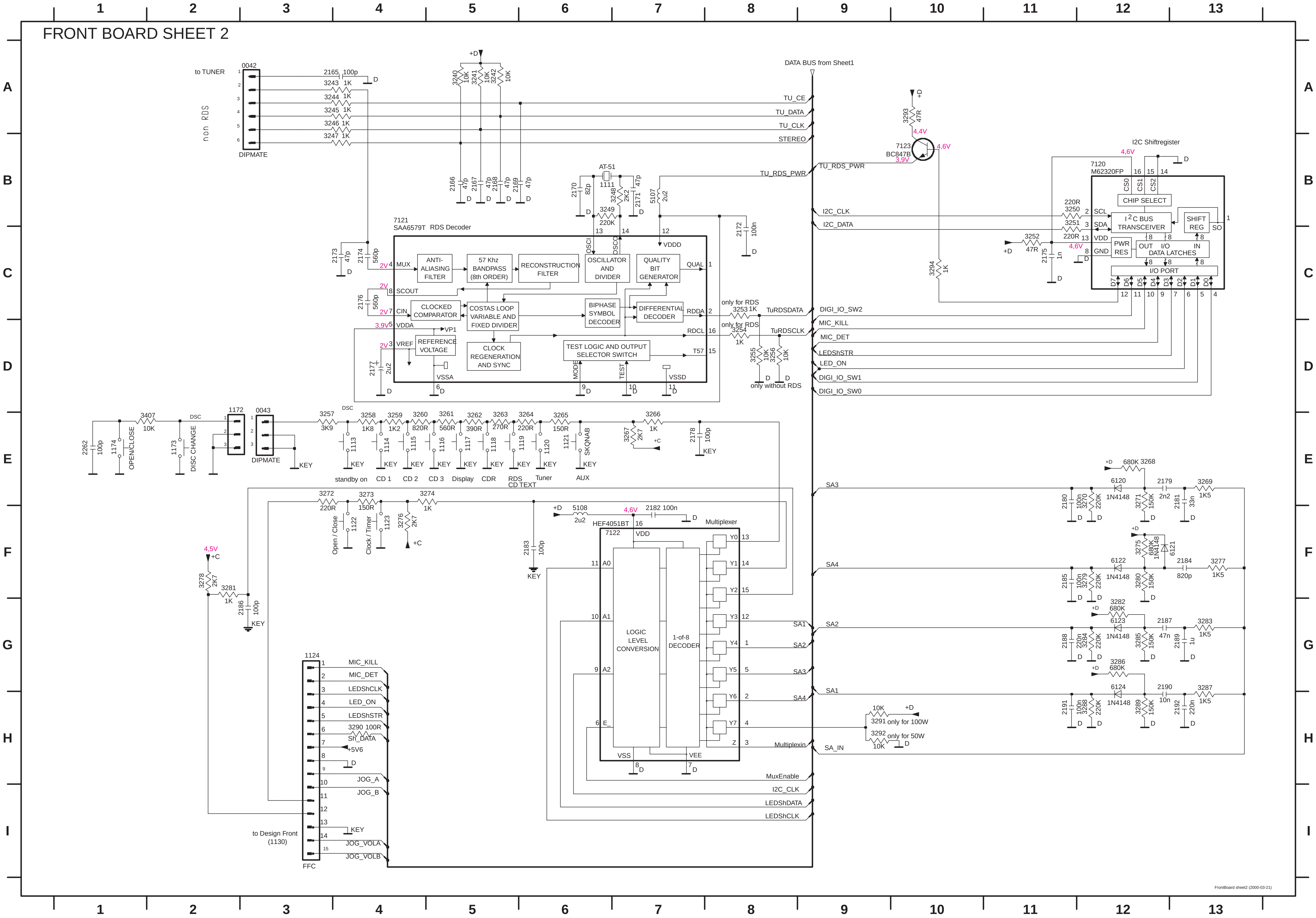


This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

0401	G1
0402	G1
0403	G1
0404	G2
0405	H2
0406	H2
1101	A9
1102	A15
1103	D13
1104	D15
1105	E15
1106	F15
1107	E4
1108	D3
2100	A12
2101	A11
2102	A11
2103	B11
2108	A2
2109	A3
2110	A12
2111	A12
2114	D12
2115	B14
2116	B14
2121	B2
2122	B3
2124	D14
2125	D14
2126	D14
2127	E4
2128	E4
2134	G10
2135	C11
2136	C11
2137	C11
2138	C11
2139	D11
2140	D11
2141	D11
2142	D11
2143	D11
2144	D11
2145	D11
2146	E11
2150	H3
2151	H11
2152	A4
2153	H4
2154	H5
2155	H3
2156	A10
2157	H3
2158	H8
2159	H7
2161	H1
2193	H1
2194	H1
2195	H1
2196	H2
2197	H2
2198	H2
2199	F15
2200	F10
3094	B1
3095	E11
3096	B3
3097	A2
3098	A3
3099	B2
3101	A1
3102	A2
3103	A3
3104	A15
3105	B5
3106	B5
3107	B6
3108	B6
3109	B6
3110	B7
3111	B7
3112	B7
3113	B7
3114	B8
3115	B8
3116	B8
3117	B9
3118	B9
3119	A15
3120	B15
3121	B5
3122	B5
3123	B6
3124	B6
3125	B6
3126	B6
3127	B7
3128	B7
3129	B7
3130	B8
3131	B8
3132	B8
3133	B8
3134	B9
3135	B9
3136	B12
3137	B1
3138	B2
3139	B3
3140	B12
3141	C5
3142	C10
3143	B12
3144	C4
3145	C10
3146	C12
3147	C5
3148	C10
3149	C12
3150	C4
3151	C10
3152	C12
3153	C5
3154	C10
3155	C12
3156	C14
3158	C10
3159	C15
3160	D10
3161	C14
3162	D10
3163	C15
3164	D10
3165	C15
3166	D10
3167	D15
3168	D10
3169	D10
3170	D10
3171	E10
3172	E10
3173	E4
3174	E10
3175	D14
3176	E5
3177	E10
3178	E4
3179	E10
3180	E5
3181	E4
3182	A12
3183	A12
3184	A12
3185	E15
3186	F5
3187	F5
3188	F6
3189	F6
3190	F6
3191	F7
3192	F7
3193	F7
3194	F7
3195	F8
3196	F8
3197	F8
3198	F9
3199	F9
3200	G5
3201	G6
3202	G6
3203	G6
3204	G6
3205	G7
3206	G7
3207	G7
3208	G8
3209	G8
3210	G8
3211	G8
3212	G9
3213	F9
3214	E15
3215	F11
3216	F12
3217	A14
3218	H12
3219	H11
3220	B11
3221	H8
3222	H5
3223	H5
3224	B14
3225	H4
3226	H3
3227	H5
3228	H7
3230	H7
3231	H3
3232	H5
3233	D12
3234	H6
3235	A12
3236	D15
3237	F12
3238	H12
5101	C2
5102	F10
5103	D4
5104	F11
5109	A4
5110	A10
5111	A1
5112	B1
6101	B13
6102	B13
6103	B13
6104	C13
6105	C13
6106	C13
6107	C13
6108	F11
6109	H6
6110	H11
6200	C1
6201	C1
6202	D1
6203	D1
6205	E1
6206	E1
6207	E1
6208	E1
6209	F1
6210	F1
6211	F1
7101	A1
7102	A2
7103	A3
7104	B1
7105	B2
7106	B3
7107	A11
7108	D6
7110	H6
7111	H3
7112	H8


FRONT BOARD SHEET 1
DISPLAY
BJ721GNK
1101
CPU
7108
TMP88CU77ZF
VFT - DRIVER - CIRCUIT
ADRESS / DATA - BUS
RAM
ROM
VFT - DRIVER PE
VFT - DRIVER PD
VFT - DRIVER P9
VFT - DRIVER P8
VFT - DRIVER P7
VFT - DRIVER P6
VFT - DRIVER PF
CPU - CLK
P0 I/O
P1 3-STATE I/O
P3 3-STATE I/O
P4 ANALOG IN 3-STATE I/O
P5 ANALOG IN 3-STATE I/O
P2 I/O
74HC4094D
7107
SRG8
7xLTL-1CHAE
0V = LED on
5V = LED off
EH-B
1103
1102
to AF-BOARD (1536)
FE-BT-VK-N
1104
to AF-BOARD (1538)
1105
to CDR-Module (1704)
1106
to Digital switching (1160)
M24C01
EEPROM
7110
IR-EYE
TSOP2836
7112
BC847B
7111
12x BAW56
DATA BUS TO SHEET 2
LEDShDATA
LEDShCLK
LEDShSTR
LED_ON
HP_DET
SA_IN
AmNTC
PWRDWN
I2C_DATA
I2C_CLK
CDSILD
CDShDATA
CDSICL
CDShCLK
CDShSTR
CDSwInfo
Sh_DATA
CDTXTin
CdTxtDQSV
CDTXTCLK
I2CW_DATA
I2CW_CLK
CWReqKbe
CWReset
DIGI_IO_SW2
DIGI_IO_SW0
DIGI_IO_SW1
RESET
JOG_VOLB
I2CW_DATA
I2CW_CLK
JOG_B
TU_DATA
JOG_VOLA
RC5
CDTXTDQSV
JOG_A
CDSwInfo
TuRDSCLK
CDShSTR
CDSICL
CDTXTCLK
CDShDATA
CDSILD
CDShCLK
I2C_CLK
I2C_DATA
PWRDWN
AmNTC
Multiplexin
MuxEnable
CWReqKbe
CWReset
LEDShCLK
LEDShDATA
TuRDSDATA
STEREO
TU_CLK
TU_CE
shield1
shield2
shield3
shield4
shield5
. . . V DC Voltages measured during operation

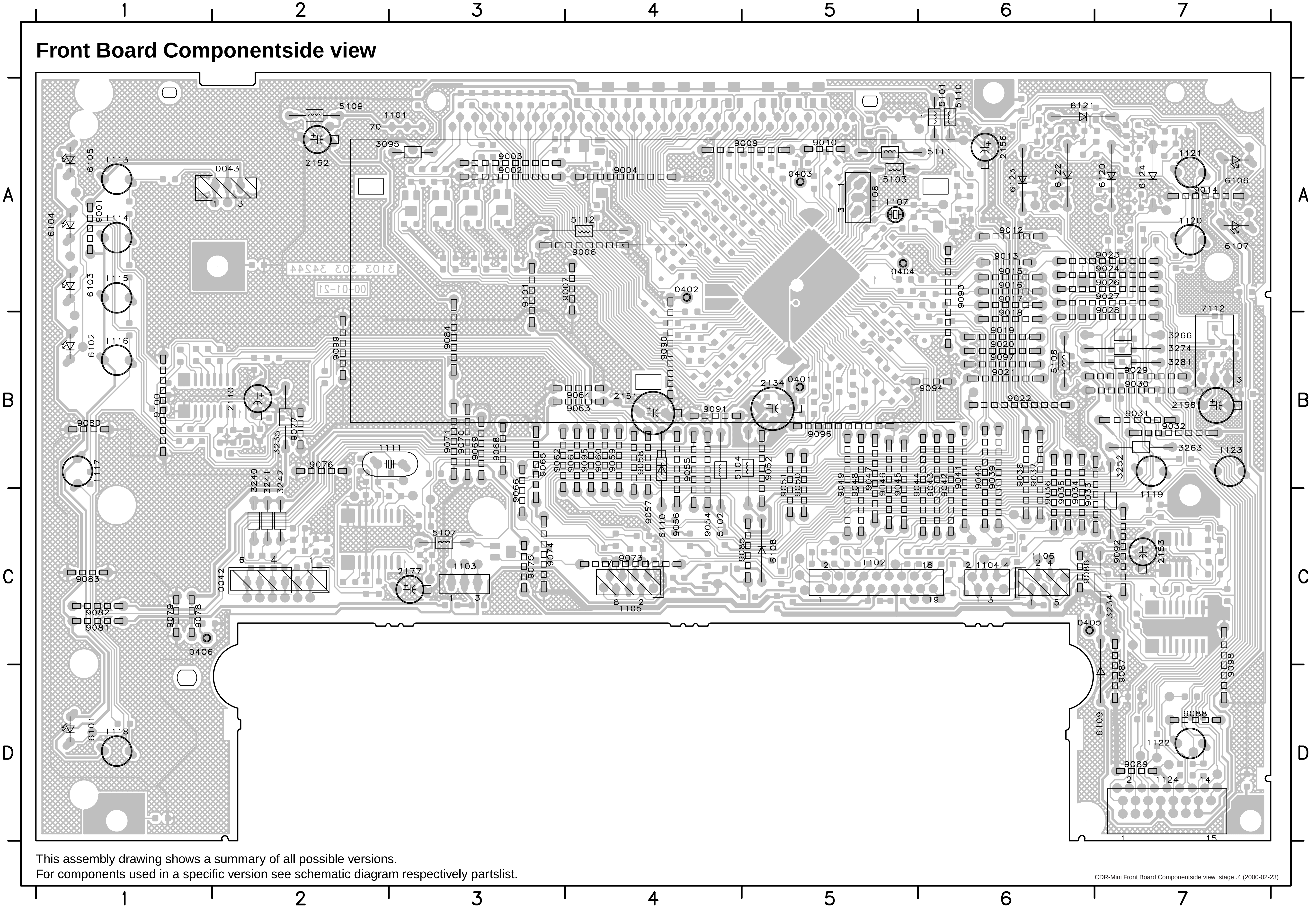
FRONT BOARD SHEET 2


to TUNER
0042
DIPMATE
non RDS
DATA BUS from Sheet1
TU_CE
TU_DATA
TU_CLK
STEREO
TU_RDS_PWR
I2C_CLK
I2C_DATA
DIGI_IO_SW2
MIC_KILL
MIC_DET
LEDShSTR
LED_ON
DIGI_IO_SW1
DIGI_IO_SW0
7121
SAA6579T RDS Decoder
ANTI-ALIASING FILTER
57 Khz BANDPASS (8th ORDER)
RECONSTRUCTION FILTER
OSCILLATOR AND DIVIDER
QUALITY BIT GENERATOR
CLOCKED COMPARATOR
COSTAS LOOP VARIABLE AND FIXED DIVIDER
BIPHASE SYMBOL DECODER
DIFFERENTIAL DECODER
REFERENCE VOLTAGE
CLOCK REGENERATION AND SYNC
TEST LOGIC AND OUTPUT SELECTOR SWITCH
MUX
SCOUT
CIN
VDDA
VREF
VP1
VSSA
MODE
TEST
VSSD
VDDD
QUAL
RDDA
RDCL
T57
OSCI
OSCO
AT-51
only for RDS
TuRDSDATA
TuRDSCLK
only without RDS
7123
BC847B
4,4V
4,6V
3,9V
I2C Shiftregister
7120
M62320FP
CHIP SELECT
I2C BUS TRANSCEIVER
SHIFT REG
PWR RES
OUT I/O IN DATA LATCHES
I/O PORT
CS0 CS1 CS2
SCL SDA VDD GND SO
D7 D6 D5 D4 D3 D2 D1 D0
1172
0043
DSC
OPEN/CLOSE
DISC CHANGE
KEY
standby on
CD 1
CD 2
CD 3
Display
CDR
RDS CD TEXT
Tuner
AUX
SKQNAB
Open / Close
Clock / Timer
5108
HEF4051BT
7122
Multiplexer
LOGIC LEVEL CONVERSION
1-of-8 DECODER
VDD
VSS
VEE
A0 A1 A2 E_
Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Z
SA1 SA2 SA3 SA4
Multiplexin
SA_IN
MuxEnable
I2C_CLK
LEDShDATA
LEDShCLK
only for 100W
only for 50W
1124
MIC_KILL
MIC_DET
LEDShCLK
LED_ON
LEDShSTR
Sh_DATA
+5V6
JOG_A
JOG_B
KEY
JOG_VOLA
JOG_VOLB
to Design Front (1130)
FFC
1N4148
FrontBoard sheet2 (2000-03-21)

0042	A3
0043	E3
1111	B6
1113	E4
1114	E4
1115	E4
1116	E5
1117	E5
1118	E5
1119	E6
1120	E6
1121	E6
1122	F4
1123	F4
1124	G3
2165	A3
2166	B5
2167	B5
2168	B5
2169	B5
2170	B6
2171	B7
2172	C8
2173	C4
2174	C4
2175	C11
2176	C4
2177	D4
2178	E7
2179	E12
2180	E11
2181	E13
2182	F7
2183	F6
2184	F13
2185	F11
2186	G3
2187	G12
2188	G11
2189	G13
2190	G12
2191	H11
2192	H13
3240	A5
3241	A5
3242	A5
3243	A3
3244	A3
3245	A3
3246	A3
3247	B3
3248	B7
3249	B6
3250	B11
3251	B11
3252	C11
3253	C8
3254	D8
3255	D8
3256	D8
3257	D3
3258	E4
3259	E4
3260	D4
3261	D5
3262	E5
3263	D5
3264	D6
3265	E6
3266	E7
3267	E7
3268	E12
3269	E13
3270	E12
3271	E12
3272	E3
3273	E4
3274	E5
3275	F12
3276	F4
3277	F13
3278	F2
3279	F12
3280	F12
3281	F2
3282	G12
3283	G13
3284	G12
3285	G12
3286	G12
3287	G13
3288	H12
3289	H12
3290	H4
3291	H9
3292	H9
3293	A10
3294	C10
5107	B7
5108	F6
6120	E12
6121	F13
6122	F12
6123	G12
6124	G12
7120	B12
7121	B4
7122	F6
7123	B10
F424	G10
F425	G10
F426	F10
F427	E10
F478	A3
F479	A3
F480	A3
F481	A3
F482	A3
F483	B3
F484	C6
F485	B7
F486	C7
F487	D8
F488	D8
F489	E3
F490	E3
F491	G4
F492	G4
F493	G4
F494	H4
F495	H4
F496	H4
F497	H4
F498	H4
F499	H4
F500	H4
F501	I3
F502	I3
F503	I4
F504	I4
F505	I4
F506	H8

0042	C2
0043	A2
0401	B5
0402	A4
0403	A5
0404	A5
0405	C6
0406	C1
1101	A3
1102	C5
1103	C3
1104	C6
1105	C4
1106	C6
1107	A5
1108	A5
1111	B3
1113	A1
1114	A1
1115	A1
1116	B1
1117	B1
1118	D1
1119	C7
1120	A7
1121	A7
1122	D7
1123	B7
1124	D7
2110	B2
2134	B5
2151	B4
2152	A2
2153	C7
2156	A6
2158	B7
2177	C3
3095	A2
3234	C7
3235	B2
3240	B2
3241	B2
3242	B2
3252	B7
3263	B7
3266	B7
3274	B7
3281	B7
5101	A6
5102	C4
5103	A5
5104	B4
5107	C3
5108	B6
5109	A2
5110	A6
5111	A6
5112	A4
6101	D1
6102	B1
6103	A1
6104	A1
6105	A1
6106	A7
6107	A7
6108	C5
6109	D7
6110	C4
6120	A7
6121	A6
6122	A6
6123	A6
6124	A7
7112	A7
9001	A1
9002	A3
9003	A3
9004	A4
9006	A4
9007	A4
9009	A5
9010	A5
9012	A6
9013	A6
9014	A7
9015	A6
9016	A6
9017	A6
9018	B6
9019	B6
9020	B6
9021	B6
9022	B6
9023	A7
9024	A7
9026	A7
9027	A7
9028	A7
9029	B7
9030	B7
9031	B7
9032	B7
9033	C6
9034	C6
9035	C6
9036	C6
9037	B6
9038	B6
9039	B6
9040	B6
9041	B6
9042	B6
9043	B6
9044	B5
9045	B5
9046	B5
9047	B5
9048	B5
9049	B5
9050	B5
9051	B5
9052	B5
9054	C4
9055	B4
9056	C4
9057	C4
9058	B4
9059	B4
9060	B4
9061	B4
9062	B3
9063	B4
9064	B4
9065	B3
9066	C3
9068	B3
9069	B3
9070	B3
9071	B3
9073	C4
9074	C3
9075	C3
9076	B2
9077	B2
9078	C1
9079	C1
9080	B1
9081	C1
9082	C1
9083	C1
9084	B3
9085	C4
9086	C6
9087	D7
9088	D7
9089	D7
9090	B4
9091	B4
9092	C7
9093	A6
9094	B6
9095	B4
9096	B5
9097	B6
9098	D7
9099	B2
9100	B1
9101	A3

Front Board Componentside view


1
2
3
4
5
6
7
A
B
C
D
5109
1101
70
3095
2152
0043
1113
6105
1114
9001
6104
1115
6103
1116
6102
9003
9002
9004
5112
9006
9009
9010
5111
5101
5110
5103
1108
1107
0403
0404
0402
2156
6121
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6120
6124
1121
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9014
1120
6107
9012
9013
9015
9016
9017
9018
9019
9020
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9021
9023
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9026
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7112
3266
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3281
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5108
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9094
9022
2158
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9032
3263
1123
3252
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3103 303 34244
00-01-21
9007
9101
9084
9099
9090
0401
2134
2151
9064
9063
9091
9096
9100
2110
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3235
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1117
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1111
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3241
3242
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9095
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9059
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9057
6110
9056
9055
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5104
9052
9051
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6108
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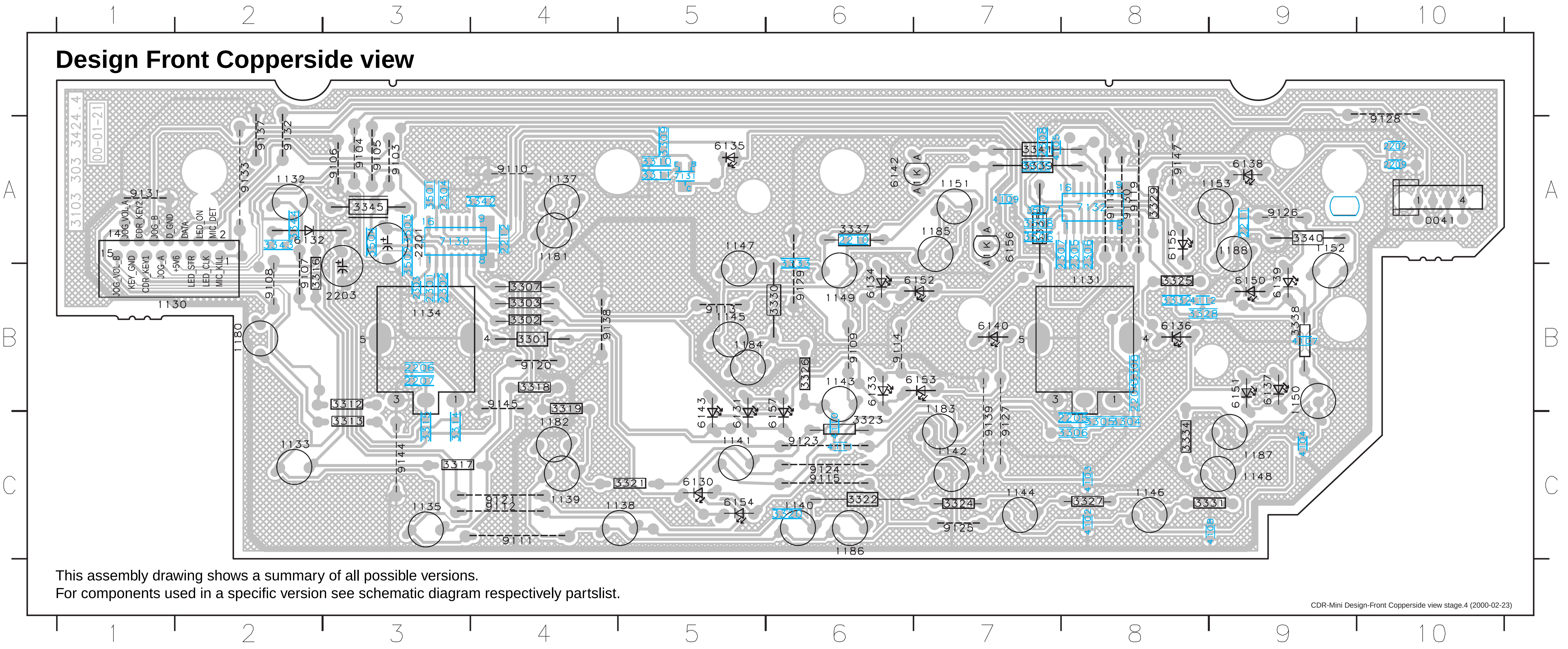
9034
9033
9092
2153
9086
3234
0405
9075
9074
5107
2177
1103
9073
1105
0042
9083
9082
9081
9079
9078
0406
1102
1104
1106
6109
9087
9098
9088
1122
9089
1124
1118
6101

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

CDR-Mini Front Board Componentside view stage .4 (2000-02-23)

0041	A10
1130	B1
1131	B8
1132	A2
1133	C2
1134	B3
1135	C3
1137	A4
1138	C5
1139	C4
1140	C6
1141	C5
1142	C7
1143	B6
1144	C7
1145	B5
1146	C8
1147	A5
1148	C9
1149	B6
1150	B9
1151	A7
1152	A9
1153	A9
1180	B2
1181	A4
1182	C4
1183	B7
1184	B5
1185	A7
1186	C6
1187	C9
1188	A9
2201	A3
2202	A10
2203	B3
2204	B8
2205	C8
2206	B3
2207	B3
2211	A9
2212	A4
2301	B3
2302	B3
2303	B3
2304	A3
2305	A8
2306	A8
2307	A7
2308	A7
3301	B4
3302	B4
3303	B4
3304	C8
3305	C8
3306	C8
3307	B4
3312	B3
3313	C3
3314	C3
3315	C3
3316	B2
3317	C3
3318	B4
3319	B4
3320	C6
3321	C5
3322	C6
3323	C6
3324	C7
3325	B8
3326	B6
3327	C8
3328	B8
3329	A8
3330	B6
3331	C9
3332	B8
3333	A6
3334	C8
3335	A7
3337	A6
3338	B9
3339	A7
3340	A9
3341	A7
3342	A4
3343	A2
3344	A2
3345	A3
3501	A3
3502	A3
3503	A3
3504	A3
3505	A7
3506	A7
3507	A7
3508	A7
4102	C8
4103	C8
4104	C9
4105	A7
4107	B9
4108	C9
4109	A7
4110	C6
4111	C6
4112	B8
6130	C5
6131	C5
6132	A2
6133	B6
6134	B6
6135	A5
6136	B8
6137	B9
6138	A9
6139	B9
6140	B7
6142	A6
6143	C5
6150	B9
6151	B9
6152	B7
6153	B7
6154	C5
6155	A8
6156	A7
6157	C6
7130	A3
7131	A5
7132	A8
9103	A3
9104	A3
9105	A3
9106	A3
9107	B2
9108	B2
9109	B6
9110	A4
9111	C4
9112	C4
9113	B5
9114	B6
9115	C6
9118	A8
9119	A8
9120	B4
9121	C4
9123	C6
9124	C6
9125	C7
9126	A9
9127	C7
9128	A10
9129	B6
9130	A8
9131	A1
9132	A2
9133	A2
9137	A2
9138	B4
9139	C7
9144	C3
9145	B4
9147	A8

Design Front Copperside view


1
2
3
4
5
6
7
8
9
10
A
B
C
3103 303 3424 4
00-01-21
JOG_VOL_A
CDR_KEY2
JOG_B
D_GND
DATA
LED_ON
MIC_DET
JOG_VOL_B
KEY_GND
CDR_KEY1
JOG_A
+5V6
LED_STR
LED_CLK
MIC_KILL
14
15
2
1
1130
9131
1132
3345
6132
2203
1134
7130
2201
1137
1181
9110
3307
3303
3302
3301
9120
3318
3319
1182
3312
3313
3317
1133
1135
9121
9112
9111
1139
1138
3321
6130
6154
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1186
6135
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9129
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6134
6152
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6142
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7132
1131
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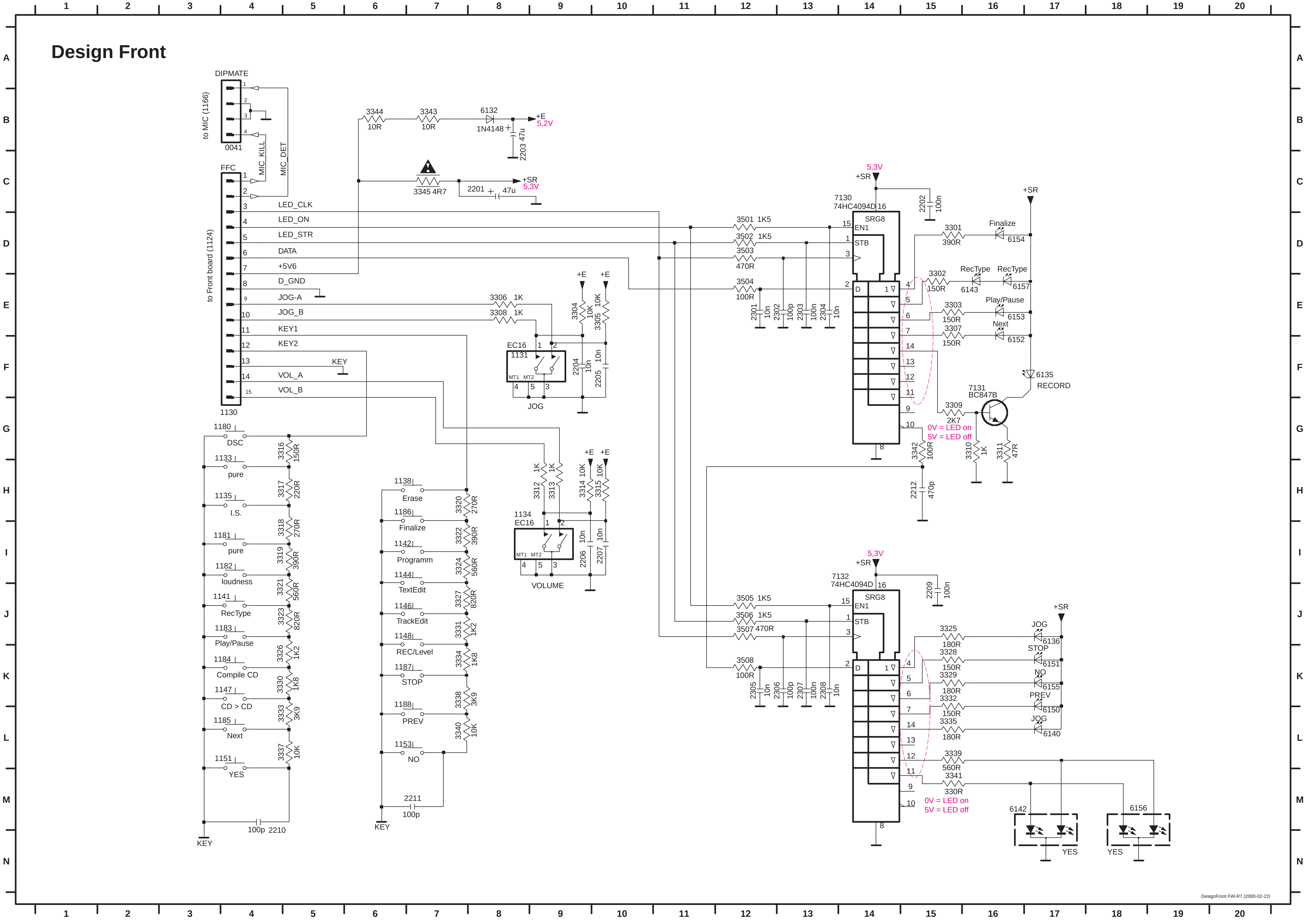
6140
6136
1143
1183
6153
1142
1141
9123
9124
9115
3322
3324
9125
1144
3327
1146
3331
1187
1148
1153
6138
9126
1188
3340
1152
6150
6139
3338
6151
6137
1150
0041
9128
1180

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

CDR-Mini Design-Front Copperside view stage.4 (2000-02-23)

Design Front


DIPMATE
to MIC (1166)
0041
MIC_KILL
MIC_DET
FFC
to Front board (1124)
LED_CLK
LED_ON
LED_STR
DATA
+5V6
D_GND
JOG-A
JOG_B
KEY1
KEY2
KEY
VOL_A
VOL_B
1130
3344 10R
3343 10R
6132 1N4148
+E 5,2V
2203 47u
3345 4R7
2201 47u
+SR 5,3V
3306 1K
3308 1K
3304 10K
3305 10K
EC16 1131
MT1 MT2
JOG
2204 10n
2205 10n
1134 EC16
VOLUME
3312 1K
3313 1K
3314 10K
3315 10K
2206 10n
2207 10n
1180 DSC
1133 pure
1135 I.S.
1181 pure
1182 loudness
1141 RecType
1183 Play/Pause
1184 Compile CD
1147 CD > CD
1185 Next
1151 YES
3316 150R
3317 220R
3318 270R
3319 390R
3321 560R
3323 820R
3326 1K2
3330 1K8
3333 3K9
3337 10K
100p 2210
KEY
1138 Erase
1186 Finalize
1142 Programm
1144 TextEdit
1146 TrackEdit
1148 REC/Level
1187 STOP
1188 PREV
1153 NO
3320 270R
3322 390R
3324 560R
3327 820R
3331 1K2
3334 1K8
3338 3K9
3340 10K
2211 100p
KEY
7130 74HC4094D
SRG8
EN1
STB
D
3501 1K5
3502 1K5
3503 470R
3504 100R
2301 10n
2302 100p
2303 100n
2304 10n
2202 100n
3301 390R
Finalize 6154
3302 150R
RecType 6143
RecType 6157
3303 150R
Play/Pause 6153
3307 150R
Next 6152
6135 RECORD
7131 BC847B
3309 2K7
0V = LED on
5V = LED off
3342 100R
3310 1K
3311 47R
2212 470p
7132 74HC4094D
3505 1K5
3506 1K5
3507 470R
3508 100R
2305 10n
2306 100p
2307 100n
2308 10n
2209 100n
3325 180R
JOG 6136
3328 150R
STOP 6151
3329 180R
NO 6155
3332 150R
PREV 6150
3335 180R
JOG 6140
3339 560R
3341 330R
6142
6156
YES
YES
DesignFront FW-R7 (2000-02-22)

0041	B4
1130	G4
1131	F8
1132	G4
1133	H4
1134	H8
1135	H4
1137	I4
1138	H7
1139	I4
1140	H7
1141	J4
1142	I7
1143	J4
1144	I7
1145	K4
1146	J7
1147	K4
1148	J7
1149	L4
1150	K7
1151	L4
1152	L6
1153	L7
1180	G3
1181	I3
1182	J3
1183	K3
1184	K3
1185	L3
1186	I6
1187	K6
1188	L6
2201	C8
2202	C15
2203	C8
2204	F9
2205	F10
2206	I9
2207	I10
2209	J15
2210	M4
2211	M7
2212	H15
2301	E12
2302	E13
2303	E13
2304	E13
2305	K12
2306	K13
2307	K13
2308	K13
3301	D15
3302	E15
3303	E15
3304	E9
3305	E10
3306	E8
3307	E15
3308	E8
3309	G15
3310	G16
3311	G16
3312	H9
3313	H9
3314	H9
3315	H10
3316	G5
3317	H5
3318	I5
3319	I4
3320	H7
3321	J4
3322	I7
3323	J5
3324	I7
3325	J15
3326	K4
3327	J7
3328	K15
3329	K15
3330	K4
3331	J7
3332	K15
3333	L5
3334	K7
3335	L15
3337	L5
3338	K7
3339	L15
3340	L7
3341	M15
3342	G15
3343	B7
3344	B6
3345	C7
3501	D12
3502	D12
3503	D12
3504	E12
3505	J12
3506	J12
3507	J12
3508	K12
6130	D16
6131	E16
6132	B8
6133	E16
6134	F16
6135	F17
6136	J17
6137	K17
6138	K17
6139	L17
6140	L17
6142	M16
6143	E16
6150	L18
6151	K18
6152	F17
6153	E17
6154	D17
6155	K18
6156	M18
6157	E17
7130	C13
7131	F16
7132	I13
F400	C4
F401	D4
F402	D4
F403	D4
F404	D4
F405	E4
F406	E4
F407	E4
F408	E4
F409	F4
F410	F4
F411	F4
F412	F4
F413	C4
F414	A4
F415	B4
F416	B4
F417	C4
F418	L15
F419	L16
F420	M15
F421	M16
F550	D16
F551	D15
F552	E16
F553	E16
F554	G16
F555	J16
F556	K16
F557	K16
F558	K16
F559	L16

ELECTRICAL PARTSLIST FRONT BOARD

MISCELLANEOUS

1101	3103 308 52930	DISPLAY, BJ721GNK
1102	8203 303 90420	FLEX FOIL CONNECTOR 19P
1104	4822 267 10733	FFC SOCKET, 4P
1105	4822 267 10953	FLEX FOIL CONNECTOR 7P
1106	4822 267 10954	FFC SOCKET, 5P
1113	4822 276 13775	TACT SWITCH
1114	4822 276 13775	TACT SWITCH
1115	4822 276 13775	TACT SWITCH
1116	4822 276 13775	TACT SWITCH
1117	4822 276 13775	TACT SWITCH
1118	4822 276 13775	TACT SWITCH
1119	4822 276 13775	TACT SWITCH
1120	4822 276 13775	TACT SWITCH
1121	4822 276 13775	TACT SWITCH
1122	4822 276 13775	TACT SWITCH
1123	4822 276 13775	TACT SWITCH
1124	4822 265 10979	FLEX FOIL CONNECTOR 15P
1130	4822 265 10979	FLEX FOIL CONNECTOR 15P
1131	8203 303 84410	JOG ENCODER
1134	8203 303 84730	VOL ENCODER
1135	4822 276 13775	TACT SWITCH
1138	4822 276 13775	TACT SWITCH
1141	4822 276 13775	TACT SWITCH
1142	4822 276 13775	TACT SWITCH
1144	4822 276 13775	TACT SWITCH
1146	4822 276 13775	TACT SWITCH
1147	4822 276 13775	TACT SWITCH
1148	4822 276 13775	TACT SWITCH
1151	4822 276 13775	TACT SWITCH
1153	4822 276 13775	TACT SWITCH
1160	4822 267 10958	FFC-CONNECTOR, 5P, SIDE ENTRY
1162	4822 267 31448	CINCH SOCKET, 2-FOLD
1173	4822 276 13775	TACT SWITCH
1174	4822 276 13775	TACT SWITCH
1180	4822 276 13775	TACT SWITCH
1181	4822 276 13775	TACT SWITCH
1182	4822 276 13775	TACT SWITCH
1183	4822 276 13775	TACT SWITCH
1184	4822 276 13775	TACT SWITCH
1185	4822 276 13775	TACT SWITCH
1186	4822 276 13775	TACT SWITCH
1187	4822 276 13775	TACT SWITCH
1188	4822 276 13775	TACT SWITCH

CAPACITORS

2100 ©	5322 122 32531	100pF	5%	50V
2101 ©	4822 126 14585	100nF	10%	50V
2102 ©	4822 122 33177	10nF	20%	50V
2103 ©	4822 122 33177	10nF	20%	50V
2103 ©	5322 122 31647	1nF	10%	63V
2108 ©	4822 126 10326	180pF	5%	
2109 ©	4822 126 10326	180pF	5%	
2110	4822 124 40433	47µF	20%	25V
2111 ©	4822 126 14585	100nF	10%	50V
2114 ©	5322 122 34099	470pF	10%	63V
2115 ©	5322 122 32448	10pF	5%	50V
2116 ©	5322 122 32448	10pF	5%	50V
2121 ©	4822 126 10326	180pF	5%	
2122 ©	4822 126 10326	180pF	5%	
2124 ©	5322 122 32448	10pF	5%	50V
2125 ©	5322 122 32448	10pF	5%	50V
2126 ©	5322 122 32448	10pF	5%	50V
2127 ©	4822 126 13486	15pF	2%	63V
2128 ©	4822 126 13486	15pF	2%	63V

CAPACITORS

2134	4822 124 12245	220µF	20%	16V
2135 ©	4822 126 10326	180pF	5%	
2136 ©	4822 126 10326	180pF	5%	
2137 ©	4822 126 10326	180pF	5%	
2138 ©	4822 126 10326	180pF	5%	
2139 ©	4822 126 10326	180pF	5%	
2140 ©	4822 126 10326	180pF	5%	
2141 ©	4822 126 10326	180pF	5%	
2142 ©	4822 126 10326	180pF	5%	
2143 ©	4822 126 10326	180pF	5%	
2144 ©	4822 126 10326	180pF	5%	
2145 ©	4822 126 10326	180pF	5%	
2146 ©	4822 126 10326	180pF	5%	
2150 ©	4822 126 14585	100nF	10%	50V
2151	4822 124 12245	220µF	20%	16V
2152	4822 124 22833	10µF	20%	50V
2153	4822 124 21913	1µF	20%	63V
2154 ©	4822 126 13838	100nF	10%	50V
2155 ©	4822 122 33177	10nF	20%	50V
2156	4822 124 22833	10µF	20%	50V
2157 ©	4822 122 33177	10nF	20%	50V
2158	4822 124 81286	47µF	20%	16V
2159 ©	4822 122 33127	2,2nF	10%	63V
2161 ©	5322 122 31647	1nF	10%	63V
2165 ©	5322 122 32531	100pF	5%	50V
2166 ©	4822 126 13692	47pF	1%	63V
2167 ©	4822 126 13692	47pF	1%	63V
2168 ©	4822 126 13692	47pF	1%	63V
2169 ©	4822 126 13692	47pF	1%	63V
2170 ©	4822 126 13695	82pF	1%	63V
2171 ©	4822 126 13692	47pF	1%	63V
2172 ©	4822 126 14585	100nF	10%	50V
2173 ©	4822 126 13692	47pF	1%	63V
2174 ©	5322 116 80853	560pF	5%	63V
2175 ©	5322 122 31647	1nF	10%	63V
2176 ©	4822 122 33173	560pF	10%	63V
2177	4822 124 22652	2,2µF	20%	50V
2178 ©	5322 122 32531	100pF	5%	50V
2179 ©	4822 122 33127	2,2nF	10%	63V
2180 ©	4822 126 14076	220nF	20%	25V
2180 ©	4822 126 14585	100nF	10%	50V
2181 ©	4822 126 12105	33nF	5%	63V
2182 ©	4822 126 14585	100nF	10%	50V
2183 ©	5322 122 32531	100pF	5%	50V
2184 ©	5322 126 10184	820pF	5%	50V
2185 ©	4822 126 13482	470nF	20%	16V
2185 ©	4822 126 14585	100nF	10%	50V
2186 ©	5322 122 32531	100pF	5%	50V
2187 ©	4822 126 13751	47nF	10%	50V
2188 ©	4822 126 14076	220nF	20%	25V
2189 ©	4822 126 14043	1µF	20%	16V
2190 ©	4822 122 33177	10nF	20%	50V
2191 ©	4822 126 14076	220nF	20%	25V
2191 ©	4822 126 14585	100nF	10%	50V
2192 ©	4822 126 14076	220nF	20%	25V
2193 ©	5322 122 31647	1nF	10%	63V
2194 ©	5322 122 31647	1nF	10%	63V
2195 ©	5322 122 31647	1nF	10%	63V
2196 ©	5322 122 31647	1nF	10%	63V
2197 ©	5322 122 31647	1nF	10%	63V
2198 ©	5322 122 31647	1nF	10%	63V
2199 ©	4822 122 33177	10nF	20%	50V
2200 ©	4822 126 14585	100nF	10%	50V
2201	4822 124 81286	47µF	20%	16V

ELECTRICAL PARTSLIST FRONT BOARD

CAPACITORS

2202 ©	4822 126 14585	100nF	10%	50V
2203	4822 124 81286	47µF	20%	16V
2204 ©	4822 122 33177	10nF	20%	50V
2205 ©	4822 122 33177	10nF	20%	50V
2206 ©	4822 122 33177	10nF	20%	50V
2207 ©	4822 122 33177	10nF	20%	50V
2209 ©	4822 126 14585	100nF	10%	50V
2210 ©	5322 122 32531	100pF	5%	50V
2211 ©	5322 122 32531	100pF	5%	50V
2212 ©	5322 122 34099	470pF	10%	63V
2220 ©	4822 126 14585	100nF	10%	50V
2221 ©	4822 126 14585	100nF	10%	50V
2222 ©	4822 126 14585	100nF	10%	50V
2227 ©	4822 126 14043	1µF	20%	16V
2228 ©	4822 126 14585	100nF	10%	50V
2230 ©	4822 126 14585	100nF	10%	50V
2232 ©	5322 126 10511	1nF	5%	50V
2234 ©	4822 126 14585	100nF	10%	50V
2235 ©	5322 122 33538	150pF	5%	63V
2260 ©	4822 126 14585	100nF	10%	50V
2262 ©	5322 122 32531	100pF	5%	50V
2301 ©	4822 122 33177	10nF	20%	50V
2302 ©	5322 122 32531	100pF	5%	50V
2303 ©	4822 126 14585	100nF	10%	50V
2304 ©	4822 122 33177	10nF	20%	50V
2305 ©	4822 122 33177	10nF	20%	50V
2306 ©	5322 122 32531	100pF	5%	50V
2307 ©	4822 126 14585	100nF	10%	50V
2308 ©	4822 122 33177	10nF	20%	50V

RESISTORS

3094 ©	4822 051 20471	470Ω	5%	0,1W
3095	4822 050 11002	1kΩ	5%	0,2W
3096 ©	4822 051 20471	470Ω	5%	0,1W
3097 ©	4822 051 20471	470Ω	5%	0,1W
3098 ©	4822 051 20471	470Ω	5%	0,1W
3099 ©	4822 051 20471	470Ω	5%	0,1W
3101 ©	4822 051 20472	4,7kΩ	5%	0,1W
3102 ©	4822 117 11149	82kΩ	1%	0,1W
3103 ©	4822 117 11149	82kΩ	1%	0,1W
3104 ©	4822 117 11503	220Ω	5%	0,1W
3105 ©	4822 117 11503	220Ω	5%	0,1W
3106 ©	4822 117 11503	220Ω	5%	0,1W
3107 ©	4822 117 11503	220Ω	5%	0,1W
3108 ©	4822 117 11503	220Ω	5%	0,1W
3109 ©	4822 117 11503	220Ω	5%	0,1W
3110 ©	4822 117 11503	220Ω	5%	0,1W
3111 ©	4822 117 11503	220Ω	5%	0,1W
3112 ©	4822 117 11503	220Ω	5%	0,1W
3113 ©	4822 117 11503	220Ω	5%	0,1W
3114 ©	4822 117 11503	220Ω	5%	0,1W
3115 ©	4822 117 11503	220Ω	5%	0,1W
3116 ©	4822 117 11503	220Ω	5%	0,1W
3117 ©	4822 117 11503	220Ω	5%	0,1W
3118 ©	4822 117 11503	220Ω	5%	0,1W
3119 ©	4822 117 11503	220Ω	5%	0,1W
3120 ©	4822 117 11503	220Ω	5%	0,1W
3121 ©	4822 117 11503	220Ω	5%	0,1W
3122 ©	4822 117 11503	220Ω	5%	0,1W
3123 ©	4822 117 11503	220Ω	5%	0,1W
3124 ©	4822 117 11503	220Ω	5%	0,1W
3125 ©	4822 117 11503	220Ω	5%	0,1W
3126 ©	4822 117 11503	220Ω	5%	0,1W
3127 ©	4822 117 11503	220Ω	5%	0,1W

RESISTORS

3128 ©	4822 117 11503	220Ω	5%	0,1W
3129 ©	4822 117 11503	220Ω	5%	0,1W
3130 ©	4822 117 11503	220Ω	5%	0,1W
3131 ©	4822 117 11503	220Ω	5%	0,1W
3132 ©	4822 117 11503	220Ω	5%	0,1W
3133 ©	4822 117 11503	220Ω	5%	0,1W
3134 ©	4822 117 11503	220Ω	5%	0,1W
3135 ©	4822 117 11503	220Ω	5%	0,1W
3136 ©	4822 117 11504	270Ω	1%	0.1W
3137 ©	4822 051 20472	4,7kΩ	5%	0,1W
3138 ©	4822 117 11149	82kΩ	1%	0,1W
3139 ©	4822 117 11149	82kΩ	1%	0,1W
3140 ©	4822 117 11504	270Ω	1%	0.1W
3141 ©	4822 117 11503	220Ω	5%	0,1W
3142 ©	4822 117 11503	220Ω	5%	0,1W
3143 ©	4822 117 11504	270Ω	1%	0.1W
3144 ©	4822 117 11503	220Ω	5%	0,1W
3145 ©	4822 051 20471	470Ω	5%	0,1W
3146 ©	4822 117 11504	270Ω	1%	0.1W
3147 ©	4822 117 11503	220Ω	5%	0,1W
3148 ©	4822 117 11503	220Ω	5%	0,1W
3149 ©	4822 117 11504	270Ω	1%	0.1W
3150 ©	4822 117 11503	220Ω	5%	0,1W
3151 ©	4822 117 11503	220Ω	5%	0,1W
3152 ©	4822 117 11504	270Ω	1%	0.1W
3153 ©	4822 051 10102	1kΩ	2%	0,25W
3154 ©	4822 117 11503	220Ω	5%	0,1W
3155 ©	4822 117 11504	270Ω	1%	0.1W
3156 ©	4822 051 10102	1kΩ	2%	0,25W
3158 ©	4822 117 11503	220Ω	5%	0,1W
3159 ©	4822 051 20471	470Ω	5%	0,1W
3160 ©	4822 117 11503	220Ω	5%	0,1W
3161 ©	4822 051 10102	1kΩ	2%	0,25W
3162 ©	4822 117 11503	220Ω	5%	0,1W
3163 ©	4822 051 10102	1kΩ	2%	0,25W
3164 ©	4822 117 11503	220Ω	5%	0,1W
3165 ©	4822 051 20471	470Ω	5%	0,1W
3166 ©	4822 117 11503	220Ω	5%	0,1W
3167 ©	4822 051 10102	1kΩ	2%	0,25W
3168 ©	4822 117 11503	220Ω	5%	0,1W
3169 ©	4822 117 11503	220Ω	5%	0,1W
3170 ©	4822 117 11503	220Ω	5%	0,1W
3171 ©	4822 117 11503	220Ω	5%	0,1W
3172 ©	4822 051 10102	1kΩ	2%	0,25W
3173 ©	4822 051 10102	1kΩ	2%	0,25W
3174 ©	4822 051 10102	1kΩ	2%	0,25W
3175 ©	4822 051 10102	1kΩ	2%	0,25W
3176 ©	4822 051 20101	100Ω	5%	0,1W
3177 ©	4822 051 10102	1kΩ	2%	0,25W
3178 ©	4822 051 20101	100Ω	5%	0,1W
3179 ©	4822 051 10102	1kΩ	2%	0,25W
3180 ©	4822 051 10102	1kΩ	2%	0,25W
3181 ©	4822 051 10102	1kΩ	2%	0,25W
3182 ©	4822 051 20471	470Ω	5%	0,1W
3183 ©	4822 117 11139	1,5kΩ	1%	0,1W
3184 ©	4822 117 11139	1,5kΩ	1%	0,1W
3185 ©	4822 051 20101	100Ω	5%	0,1W
3186 ©	4822 051 10102	1kΩ	2%	0,25W
3187 ©	4822 051 10102	1kΩ	2%	0,25W
3188 ©	4822 051 10102	1kΩ	2%	0,25W
3189 ©	4822 051 20471	470Ω	5%	0,1W
3190 ©	4822 051 10102	1kΩ	2%	0,25W
3191 ©	4822 051 20471	470Ω	5%	0,1W
3192 ©	4822 051 10102	1kΩ	2%	0,25W

ELECTRICAL PARTSLIST FRONT BOARD

RESISTORS

3193 ©	4822 051 10102	1kΩ	2%	0,25W
3194 ©	4822 051 10102	1kΩ	2%	0,25W
3195 ©	4822 051 10102	1kΩ	2%	0,25W
3196 ©	4822 051 10102	1kΩ	2%	0,25W
3197 ©	4822 051 10102	1kΩ	2%	0,25W
3198 ©	4822 051 10102	1kΩ	2%	0,25W
3199 ©	4822 051 10102	1kΩ	2%	0,25W
3200 ©	4822 051 10102	1kΩ	2%	0,25W
3201 ©	4822 051 10102	1kΩ	2%	0,25W
3202 ©	4822 051 10102	1kΩ	2%	0,25W
3203 ©	4822 051 10102	1kΩ	2%	0,25W
3204 ©	4822 051 10102	1kΩ	2%	0,25W
3205 ©	4822 051 10102	1kΩ	2%	0,25W
3206 ©	4822 051 10102	1kΩ	2%	0,25W
3207 ©	4822 051 10102	1kΩ	2%	0,25W
3208 ©	4822 051 10102	1kΩ	2%	0,25W
3209 ©	4822 051 10102	1kΩ	2%	0,25W
3210 ©	4822 051 10102	1kΩ	2%	0,25W
3211 ©	4822 051 10102	1kΩ	2%	0,25W
3212 ©	4822 051 10102	1kΩ	2%	0,25W
3213 ©	4822 051 10102	1kΩ	2%	0,25W
3214 ©	4822 051 20101	100Ω	5%	0,1W
3215 ©	4822 051 20478	4,7Ω	5%	0,1W
3216 ©	4822 051 20478	4,7Ω	5%	0,1W
3217 ©	4822 051 20684	680kΩ	5%	0,1W
3218 ©	4822 051 20478	4,7Ω	5%	0,1W
3219 ©	4822 051 20478	4,7Ω	5%	0,1W
3220 ©	4822 051 20101	100Ω	5%	0,1W
3221 ©	4822 051 20101	100Ω	5%	0,1W
3222 ©	4822 117 10833	10kΩ	1%	0,1W
3223 ©	4822 117 10833	10kΩ	1%	0,1W
3224 ©	4822 051 20684	680kΩ	5%	0,1W
3225 ©	4822 051 10102	1kΩ	2%	0,25W
3226 ©	4822 117 10837	100kΩ	1%	0,1W
3227 ©	4822 051 10102	1kΩ	2%	0,25W
3228 ©	4822 117 10833	10kΩ	1%	0,1W
3230 ©	4822 051 10102	1kΩ	2%	0,25W
3231 ©	4822 117 10837	100kΩ	1%	0,1W
3232 ©	4822 051 10102	1kΩ	2%	0,25W
3233 ©	4822 051 20101	100Ω	5%	0,1W
3234	4822 116 52175	100Ω	5%	0,5W
3235	4822 116 52195	47Ω	5%	0,5W
3236 ©	4822 051 20333	33kΩ	5%	0,1W
3237 ©	4822 051 20478	4,7Ω	5%	0,1W
3238 ©	4822 051 20478	4,7Ω	5%	0,1W
3240	4822 050 21003	10kΩ	2%	0,25W
3241	4822 050 21003	10kΩ	2%	0,25W
3242	4822 050 21003	10kΩ	2%	0,25W
3243 ©	4822 051 10102	1kΩ	2%	0,25W
3244 ©	4822 051 10102	1kΩ	2%	0,25W
3245 ©	4822 051 10102	1kΩ	2%	0,25W
3246 ©	4822 051 10102	1kΩ	2%	0,25W
3247 ©	4822 051 10102	1kΩ	2%	0,25W
3248 ©	4822 117 11449	2,2kΩ	1%	0,1W
3249 ©	4822 117 13579	220kΩ	1%	0.1W
3250 ©	4822 117 11503	220Ω	5%	0,1W
3251 ©	4822 117 11503	220Ω	5%	0,1W
3252	4822 116 52195	47Ω	5%	0,5W
3253 ©	4822 051 10102	1kΩ	2%	0,25W
3254 ©	4822 051 10102	1kΩ	2%	0,25W
3255 ©	4822 117 10833	10kΩ	1%	0,1W
3256 ©	4822 117 10833	10kΩ	1%	0,1W
3257 ©	4822 051 20392	3,9kΩ	5%	0,1W
3258 ©	4822 051 20182	1,8kΩ	5%	0,1W

RESISTORS

3259 ©	4822 051 20122	1,2kΩ	5%	0,1W
3260 ©	4822 117 11454	820Ω	1%	
3261 ©	4822 051 20561	560Ω	5%	0,1W
3262 ©	4822 051 20391	390Ω	5%	0,1W
3263	4822 116 83876	270Ω	5%	0.16W
3264 ©	4822 117 11503	220Ω	5%	0,1W
3265 ©	4822 117 10353	150Ω	5%	0,1W
3266	4822 050 11002	1kΩ	5%	0,2W
3267 ©	4822 117 12955	2,7kΩ	1%	0,1W
3268 ©	4822 051 20684	680kΩ	5%	0,1W
3269 ©	4822 117 11139	1,5kΩ	1%	0,1W
3270 ©	4822 051 20474	470kΩ	5%	0,1W
3270 ©	4822 117 13579	220kΩ	1%	0.1W
3271 ©	4822 051 20154	150kΩ	5%	0,1W
3271 ©	4822 117 10834	47kΩ	1%	0,1W
3272 ©	4822 117 11503	220Ω	5%	0,1W
3273 ©	4822 117 10353	150Ω	5%	0,1W
3274	4822 050 11002	1kΩ	5%	0,2W
3275 ©	4822 051 20684	680kΩ	5%	0,1W
3276 ©	4822 117 12955	2,7kΩ	1%	0,1W
3277 ©	4822 117 11139	1,5kΩ	1%	0,1W
3278 ©	4822 117 12955	2,7kΩ	1%	0,1W
3279 ©	4822 051 20474	470kΩ	5%	0,1W
3279 ©	4822 117 13579	220kΩ	1%	0.1W
3280 ©	4822 051 20154	150kΩ	5%	0,1W
3280 ©	4822 117 10834	47kΩ	1%	0,1W
3281	4822 050 11002	1kΩ	5%	0,2W
3282 ©	4822 051 20684	680kΩ	5%	0,1W
3283 ©	4822 117 11139	1,5kΩ	1%	0,1W
3284 ©	4822 051 20474	470kΩ	5%	0,1W
3284 ©	4822 117 13579	220kΩ	1%	0.1W
3285 ©	4822 051 20154	150kΩ	5%	0,1W
3285 ©	4822 117 10834	47kΩ	1%	0,1W
3286 ©	4822 051 20684	680kΩ	5%	0,1W
3287 ©	4822 117 11139	1,5kΩ	1%	0,1W
3288 ©	4822 051 20474	470kΩ	5%	0,1W
3288 ©	4822 117 13579	220kΩ	1%	0.1W
3289 ©	4822 051 20154	150kΩ	5%	0,1W
3289 ©	4822 117 10834	47kΩ	1%	0,1W
3290 ©	4822 051 20101	100Ω	5%	0,1W
3292 ©	4822 117 10833	10kΩ	1%	0,1W
3293 ©	4822 051 20479	47Ω	5%	0,1W
3294 ©	4822 051 10102	1kΩ	2%	0,25W
3301	4822 116 83881	390Ω	5%	0,5W
3302	4822 116 83868	150Ω	5%	0,5W
3302	4822 116 83881	390Ω	5%	0,5W
3303	4822 116 83868	150Ω	5%	0,5W
3304 ©	4822 117 10833	10kΩ	1%	0,1W
3305 ©	4822 117 10833	10kΩ	1%	0,1W
3306 ©	4822 051 10102	1kΩ	2%	0,25W
3307	4822 116 83868	150Ω	5%	0,5W
3308 ©	4822 051 10102	1kΩ	2%	0,25W
3309 ©	4822 117 12955	2,7kΩ	1%	0,1W
3310 ©	4822 051 10102	1kΩ	2%	0,25W
3311 ©	4822 051 20479	47Ω	5%	0,1W
3312	4822 050 11002	1kΩ	5%	0,2W
3313	4822 050 11002	1kΩ	5%	0,2W
3314 ©	4822 117 10833	10kΩ	1%	0,1W
3315 ©	4822 117 10833	10kΩ	1%	0,1W
3316	4822 116 83868	150Ω	5%	0,5W
3317	4822 116 83872	220Ω	5%	0,5W
3318	4822 116 83876	270Ω	5%	0.16W
3319	4822 116 83881	390Ω	5%	0,5W
3320 ©	4822 117 11504	270Ω	1%	0.1W

ELECTRICAL PARTSLIST FRONT BOARD

RESISTORS

3321	4822 116 52226	560Ω	5%	0,5W
3322	4822 116 83881	390Ω	5%	0,5W
3323	4822 116 52231	820Ω	5%	0,5W
3324	4822 116 52226	560Ω	5%	0,5W
3325	4822 116 52213	180Ω	5%	0,5W
3326	4822 116 52207	1,2kΩ	5%	0,5W
3327	4822 116 52231	820Ω	5%	0,5W
3328 ©	4822 117 10353	150Ω	5%	0,1W
3329	4822 116 52213	180Ω	5%	0,5W
3330	4822 116 52249	1,8kΩ	5%	0,16W
3331	4822 116 52207	1,2kΩ	5%	0,5W
3332 ©	4822 117 10353	150Ω	5%	0,1W
3333 ©	4822 051 20392	3,9kΩ	5%	0,1W
3334	4822 116 52249	1,8kΩ	5%	0,16W
3335	4822 116 52213	180Ω	5%	0,5W
3337	4822 050 21003	10kΩ	2%	0,25W
3338	4822 116 52276	3,9kΩ	5%	0,5W
3339	4822 116 52226	560Ω	5%	0,5W
3340	4822 050 21003	10kΩ	2%	0,25W
3341	4822 116 52219	330Ω	5%	0,5W
3342 ©	4822 051 20101	100Ω	5%	0,1W
3343 ©	4822 051 20109	10Ω	5%	0,1W
3344 ©	4822 051 20109	10Ω	5%	0,1W
3345	4822 052 10478	4,7Ω	5%	NFR
3350	4822 116 83883	470Ω	5%	0,16W
3351 ©	4822 117 10833	10kΩ	1%	0,1W
3353 ©	4822 117 11148	56kΩ	1%	0,1W
3354 ©	4822 051 20399	39Ω	5%	0,1W
3356 ©	4822 117 11449	2,2kΩ	1%	0,1W
3357 ©	4822 051 20683	68kΩ	5%	0,1W
3358 ©	4822 117 10833	10kΩ	1%	0,1W
3359 ©	4822 117 11503	220Ω	5%	0,1W
3362 ©	4822 051 20471	470Ω	5%	0,1W
3364 ©	4822 051 20101	100Ω	5%	0,1W
3366 ©	4822 117 10837	100kΩ	1%	0,1W
3367 ©	4822 051 20829	82Ω	5%	0,1W
3368 ©	4822 051 20561	560Ω	5%	0,1W
3401 ©	4822 117 12955	2,7kΩ	1%	0,1W
3403 ©	4822 051 10102	1kΩ	2%	0,25W
3404 ©	4822 051 20479	47Ω	5%	0,1W
3407 ©	4822 117 10833	10kΩ	1%	0,1W
3501 ©	4822 117 11139	1,5kΩ	1%	0,1W
3502 ©	4822 117 11139	1,5kΩ	1%	0,1W
3503 ©	4822 051 20471	470Ω	5%	0,1W
3504 ©	4822 051 20101	100Ω	5%	0,1W
3505 ©	4822 117 11139	1,5kΩ	1%	0,1W
3506 ©	4822 117 11139	1,5kΩ	1%	0,1W
3507 ©	4822 051 20471	470Ω	5%	0,1W
3508 ©	4822 051 20101	100Ω	5%	0,1W
4001 ©	4822 051 20008	CHIP JUMPER 0805		
4002 ©	4822 051 20008	CHIP JUMPER 0805		
4004 ©	4822 051 20008	CHIP JUMPER 0805		
4005 ©	4822 051 20008	CHIP JUMPER 0805		
4006 ©	4822 051 20008	CHIP JUMPER 0805		
4007 ©	4822 051 20008	CHIP JUMPER 0805		
4008 ©	4822 051 20008	CHIP JUMPER 0805		
4009 ©	4822 051 20008	CHIP JUMPER 0805		
4012 ©	4822 051 20008	CHIP JUMPER 0805		
4013 ©	4822 051 20008	CHIP JUMPER 0805		
4014 ©	4822 051 20008	CHIP JUMPER 0805		
4015 ©	4822 051 20008	CHIP JUMPER 0805		
4016 ©	4822 051 20008	CHIP JUMPER 0805		
4017 ©	4822 051 20008	CHIP JUMPER 0805		
4018 ©	4822 051 20008	CHIP JUMPER 0805		

RESISTORS

4019 ©	4822 051 20008	CHIP JUMPER 0805
4021 ©	4822 051 20008	CHIP JUMPER 0805
4022 ©	4822 051 20008	CHIP JUMPER 0805
4024 ©	4822 051 20008	CHIP JUMPER 0805
4025 ©	4822 051 20008	CHIP JUMPER 0805
4026 ©	4822 051 20008	CHIP JUMPER 0805
4027 ©	4822 051 20008	CHIP JUMPER 0805
4028 ©	4822 051 20008	CHIP JUMPER 0805
4029 ©	4822 051 20008	CHIP JUMPER 0805
4030 ©	4822 051 20008	CHIP JUMPER 0805
4031 ©	4822 051 20008	CHIP JUMPER 0805
4032 ©	4822 051 20008	CHIP JUMPER 0805
4033 ©	4822 051 20008	CHIP JUMPER 0805
4034 ©	4822 051 20008	CHIP JUMPER 0805
4035 ©	4822 051 20008	CHIP JUMPER 0805
4036 ©	4822 051 20008	CHIP JUMPER 0805
4037 ©	4822 051 20008	CHIP JUMPER 0805
4038 ©	4822 051 20008	CHIP JUMPER 0805
4039 ©	4822 051 20008	CHIP JUMPER 0805
4040 ©	4822 051 20008	CHIP JUMPER 0805
4041 ©	4822 051 20008	CHIP JUMPER 0805
4042 ©	4822 051 20008	CHIP JUMPER 0805
4043 ©	4822 051 20008	CHIP JUMPER 0805
4044 ©	4822 051 20008	CHIP JUMPER 0805
4045 ©	4822 051 20008	CHIP JUMPER 0805
4046 ©	4822 051 20008	CHIP JUMPER 0805
4047 ©	4822 051 20008	CHIP JUMPER 0805
4048 ©	4822 051 20008	CHIP JUMPER 0805
4049 ©	4822 051 20008	CHIP JUMPER 0805
4050 ©	4822 051 20008	CHIP JUMPER 0805
4051 ©	4822 051 20008	CHIP JUMPER 0805
4052 ©	4822 051 20008	CHIP JUMPER 0805
4053 ©	4822 051 20008	CHIP JUMPER 0805
4054 ©	4822 051 20008	CHIP JUMPER 0805
4055 ©	4822 051 20008	CHIP JUMPER 0805
4056 ©	4822 051 20008	CHIP JUMPER 0805
4057 ©	4822 051 20008	CHIP JUMPER 0805
4058 ©	4822 051 20008	CHIP JUMPER 0805
4059 ©	4822 051 20008	CHIP JUMPER 0805
4060 ©	4822 051 20008	CHIP JUMPER 0805
4061 ©	4822 051 20008	CHIP JUMPER 0805
4102 ©	4822 051 20008	CHIP JUMPER 0805
4103 ©	4822 051 20008	CHIP JUMPER 0805
4104 ©	4822 051 20008	CHIP JUMPER 0805
4105 ©	4822 051 20008	CHIP JUMPER 0805
4106 ©	4822 051 20008	CHIP JUMPER 0805
4107 ©	4822 051 20008	CHIP JUMPER 0805
4108 ©	4822 051 20008	CHIP JUMPER 0805
4109 ©	4822 051 20008	CHIP JUMPER 0805
4110 ©	4822 051 20008	CHIP JUMPER 0805
4111 ©	4822 051 20008	CHIP JUMPER 0805
4112 ©	4822 051 20008	CHIP JUMPER 0805
4201 ©	4822 051 20008	CHIP JUMPER 0805
4203 ©	4822 051 20008	CHIP JUMPER 0805
4204 ©	4822 051 20008	CHIP JUMPER 0805
4205 ©	4822 051 20008	CHIP JUMPER 0805
4206 ©	4822 051 20008	CHIP JUMPER 0805
4501 ©	4822 051 20008	CHIP JUMPER 0805

COILS

1107	4822 242 70938	CRYSTAL 32,768kHz
1108	5322 242 73686	CERAMIC RESONATOR, 12MHZ
1111	4822 242 72195	XTAL 4,332MHz
5101	4822 156 21721	2,2µH

ELECTRICAL PARTSLIST FRONT BOARD

COILS

5102	4822 156 21721	2,2µH
5103	4822 156 21721	2,2µH
5104	4822 156 21721	2,2µH
5107	4822 156 21721	2,2µH
5108	4822 156 21721	2,2µH
5109	4822 156 21721	2,2µH
5110	4822 156 21721	2,2µH
5111	4822 156 21721	2,2µH
5112	4822 156 21721	2,2µH
5130	2422 536 00019	TRANSFORMER, DIGITAL OUT

DIODES

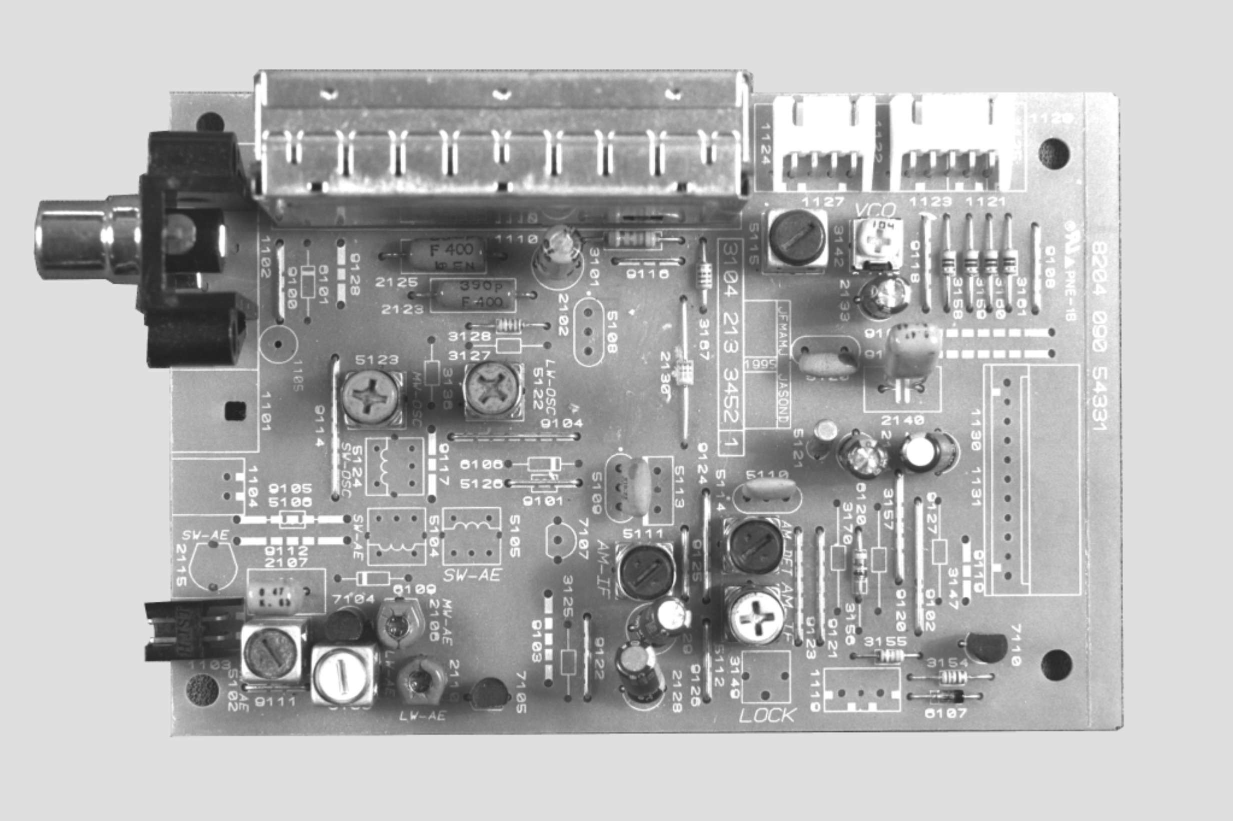
6101	4822 130 11589	LED, LTL-1CHAE
6102	4822 130 11589	LED, LTL-1CHAE
6103	4822 130 11589	LED, LTL-1CHAE
6104	4822 130 11589	LED, LTL-1CHAE
6105	9322 131 65675	LED, LTL-1CHEE
6106	4822 130 11589	LED, LTL-1CHAE
6107	4822 130 11589	LED, LTL-1CHAE
6108	4822 130 30621	1N4148
6109	4822 130 30621	1N4148
6110	4822 130 30621	1N4148
6120	4822 130 30621	1N4148
6121	4822 130 30621	1N4148
6122	4822 130 30621	1N4148
6123	4822 130 30621	1N4148
6124	4822 130 30621	1N4148
6132	4822 130 30621	1N4148
6135	8203 303 84440	LED 5MM BLUE
6136	8203 303 84850	LED, LTL2R3KFK-071A
6140	8203 303 84850	LED, LTL2R3KFK-071A
6143	4822 130 11589	LED, LTL-1CHAE
6150	4822 130 11589	LED, LTL-1CHAE
6151	4822 130 11589	LED, LTL-1CHAE
6152	4822 130 11589	LED, LTL-1CHAE
6153	4822 130 11589	LED, LTL-1CHAE
6154	4822 130 11589	LED, LTL-1CHAE
6155	4822 130 11589	LED, LTL-1CHAE
6156	8203 303 84450	LED 5MM AMBER/H.E.RED
6157	4822 130 11589	LED, LTL-1CHAE
6170	8203 303 84430	LED 5MM 90 DEGREE BLUE
6200	5322 130 30691	BAW56
6201	5322 130 30691	BAW56
6202	5322 130 30691	BAW56
6203	5322 130 30691	BAW56
6205	5322 130 30691	BAW56
6206	5322 130 30691	BAW56
6207	5322 130 30691	BAW56
6208	5322 130 30691	BAW56
6209	5322 130 30691	BAW56
6210	5322 130 30691	BAW56
6211	5322 130 30691	BAW56

TRANSISTORS

7101 ©	4822 130 60511	BC847B
7102 ©	4822 130 60511	BC847B
7103 ©	4822 130 60511	BC847B
7104 ©	4822 130 60511	BC847B
7105 ©	4822 130 60511	BC847B
7106 ©	4822 130 60511	BC847B
7111 ©	4822 130 60511	BC847B
7123 ©	4822 130 60511	BC847B
7131 ©	4822 130 60511	BC847B
7160 ©	4822 130 60511	BC847B

INTEGRATED CIRCUITS

7107 ©	4822 209 15449	74HC4094D, SHIFT REGISTER
7108 ©	8203 303 90210	TMP88CU77ZF, µP
7110 ©	9322 131 04668	M24C01, EEPROM
7112	9322 137 14667	IR RECEIVER TSOP2836ZC1
7112	9322 155 22667	IR RECEIVER TSOP2836
7120 ©	4822 209 17345	M62320FP, I2C SHIFT REGISTER
7121	4822 209 31981	SAA6579T/V1
7122 ©	5322 209 11446	HEF4051BT, MULTIPLEXER
7130 ©	4822 209 15449	74HC4094D, SHIFT REGISTER
7132 ©	4822 209 15449	74HC4094D, SHIFT REGISTER
7140 ©	4822 209 17235	74LVU04D, 6-FOLD INVERTER
7142	4822 209 10263	HEF4052BP, SELECTOR IC
7145	4822 209 10263	HEF4052BP, SELECTOR IC


1124
1120
1127
VCO
1123
1121
5115
3142
2133
9118
3158
3160
3161
9108
8204 090 54331
3104 213 3452 1
1995
1110
9116
3101
2102
5108
3107
2130
F 400
2125
390p
F 400
2123
1102
9100
9101
9128
3128
3127
3136
MW-OSC
5123
5122
LW-OSC
9104
1105
1101
9114
5124
SW-OSC
9117
6106
5126
5109
5113
9124
5114
5110
5121
2140
1130
1131
1104
9105
5106
SW-AE
2115
9112
2107
5104
5105
SW-AE
7107
AM-IF
5111
9125
AM-DET
AM-IF
6120
3170
3157
9127
3147
7104
6100
MW-AE
2106
3125
9103
9122
3156
9120
9102
9123
9121
3155
3154
7110
1103
5102
LW-AE
9111
7105
2128
9126
5112
3140
1116
LOCK
6107

Tuner 95

(3 Band RDS Tuner)

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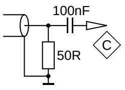
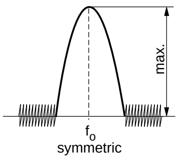
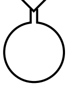
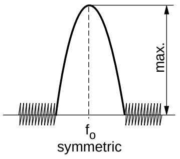
TUNER ADJUSTMENT TABLE (**TUNER 95** FM/MW/LW - version with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check	6	7...9V
			87.5MHz	check		1.3...2V
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123		8.3V ±0.2V
			531kHz	check		1V ±0.4V
LW 153 - 279kHz (3kHz grid)			279kHz	5122		8.3V ±0.2V
			153kHz	check		1V ±0.4V
FM - IF						
FM	98MHz 1mV continuous wave **shortcircuit pin 21 of IC7108 to ground**	A	98MHz	5107	1 2	0mV ±3mV
FM - VCO						
FM	98MHz 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz 1)
DISTORTION						
FM	98MHz 1mV 90% Left + 9% pilot mod=1kHz	A	98MHz	mixcoil inside tuner 1110	4	min. distortion
AM IF						
MW	450kHz Δf=10kHz as low as possible	 C	MW	5111	7	
				5112		
	450kHz continuous wave			5114	1 2	0mV ±2mV
AM RF 2)						
MW	558kHz	B  Δf = ±30kHz V_{RF} as low as possible	558kHz	5102	7	
	1494kHz		1494kHz	2106		
LW	198kHz		198kHz	5103		

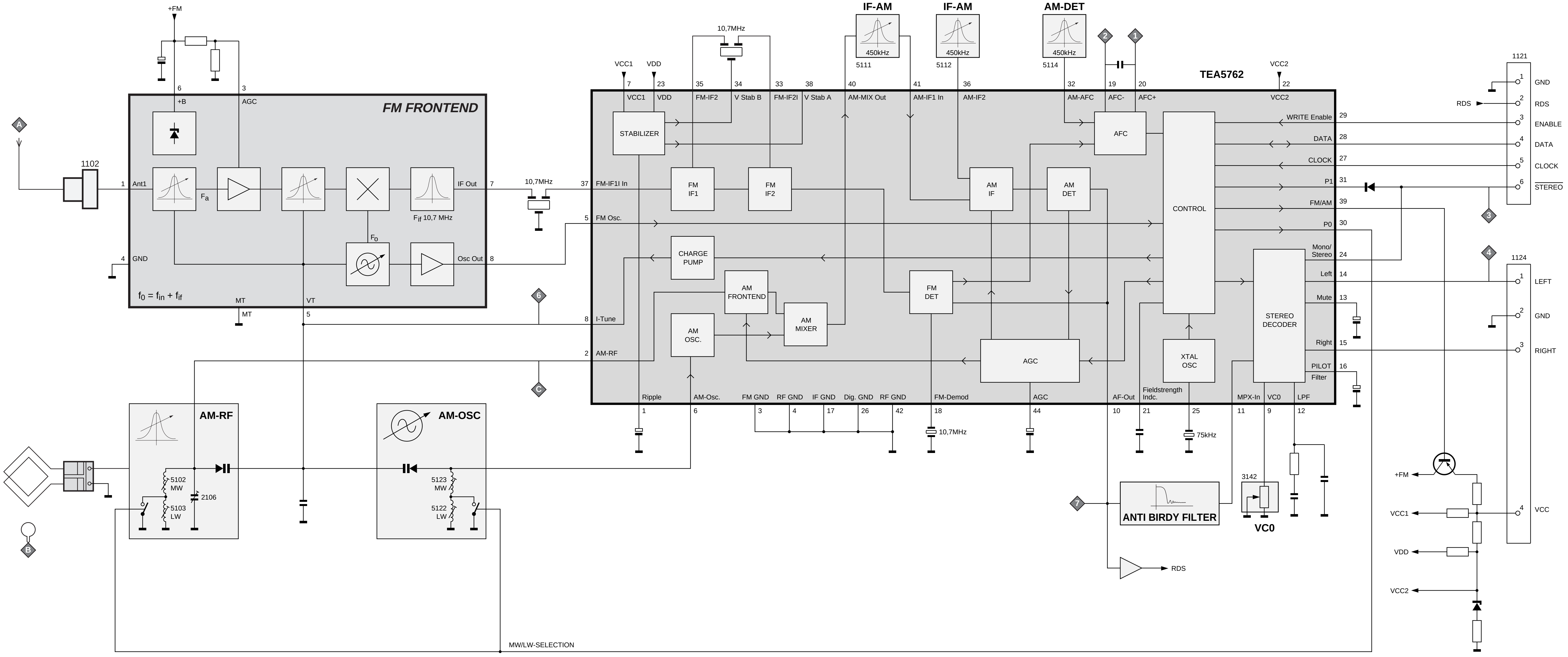
---

1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

2) For AM RF adjustments the original frame antenna has to be used !

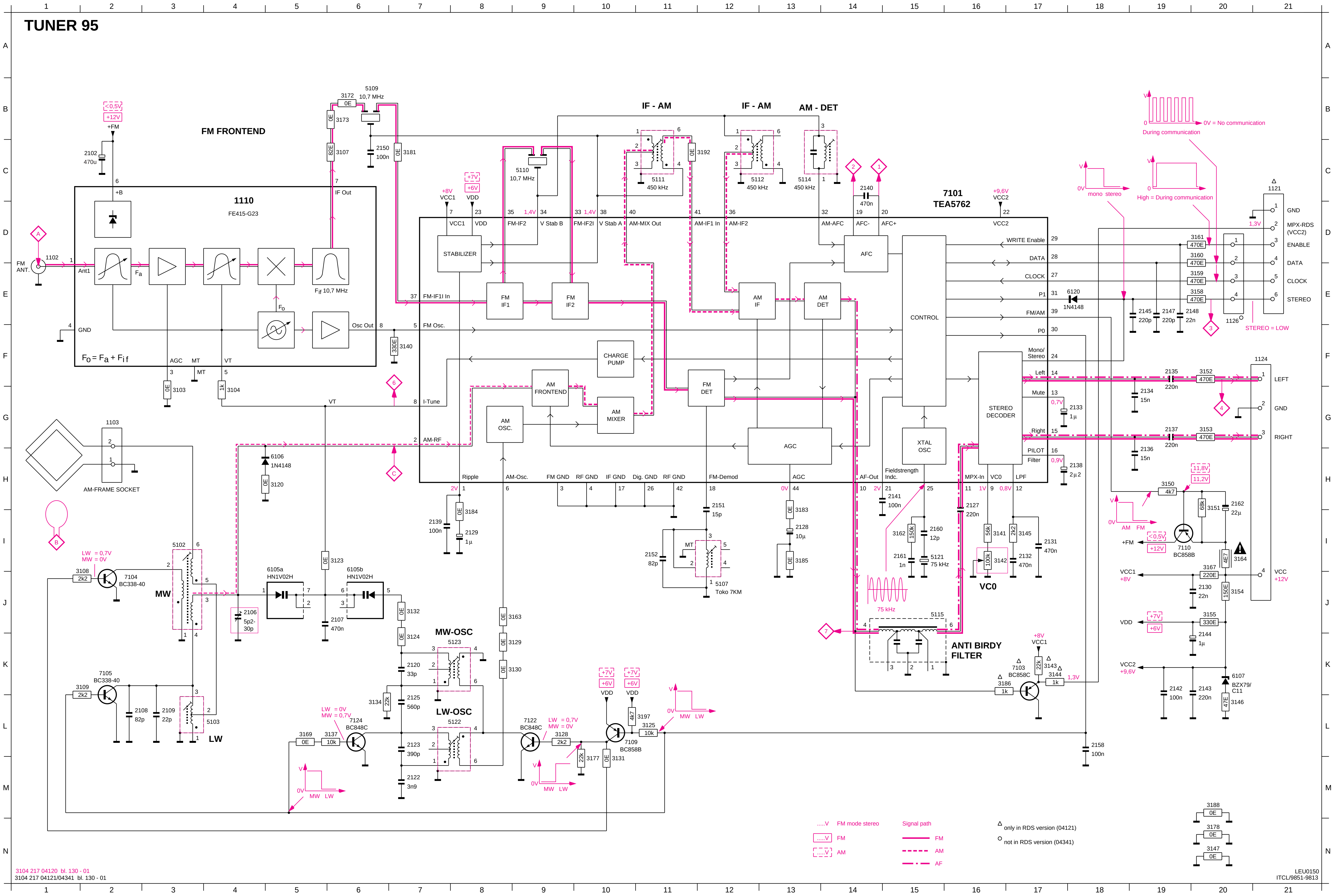
↕ Repeat

BLOCK DIAGRAM TUNER95


+FM
6
+B
3
AGC
FM FRONTEND
A
1102
1 Ant1
Fa
IF Out 7
Fif 10,7 MHz
F0
Osc Out 8
4 GND
f0 = fin + fif
MT
MT
VT
5
10,7MHz
10,7MHz
6
C
IF-AM
5111
450kHz
IF-AM
5112
450kHz
AM-DET
5114
450kHz
2
1
TEA5762
VCC1
VDD
VCC2
7 VCC1
23 VDD
35 FM-IF2
34 V Stab B
33 FM-IF2I
38 V Stab A
40 AM-MIX Out
41 AM-IF1 In
36 AM-IF2
32 AM-AFC
19 AFC-
20 AFC+
22 VCC2
STABILIZER
AFC
CONTROL
37 FM-IF1I In
5 FM Osc.
8 I-Tune
2 AM-RF
FM IF1
FM IF2
AM IF
AM DET
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
AGC
XTAL OSC
STEREO DECODER
WRITE Enable 29
DATA 28
CLOCK 27
P1 31
FM/AM 39
P0 30
Mono/ Stereo 24
Left 14
Mute 13
Right 15
PILOT Filter 16
Ripple 1
AM-Osc. 6
FM GND 3
RF GND 4
IF GND 17
Dig. GND 26
RF GND 42
FM-Demod 18
AGC 44
AF-Out 10
Fieldstrength Indc. 21
25
MPX-In 11
VC0 9
LPF 12
10,7MHz
75kHz
3142
VC0
ANTI BIRDY FILTER
7
RDS
1121
1 GND
2 RDS
3 ENABLE
4 DATA
5 CLOCK
6 STEREO
RDS
3
4
1124
1 LEFT
2 GND
3 RIGHT
4 VCC
+FM
VCC1
VDD
VCC2
AM-RF
5102 MW
5103 LW
2106
AM-OSC
5123 MW
5122 LW
B
MW/LW-SELECTION

1102	D1
1103	G2
1110	D4
1121	C21
1124	F21
1126	E20
2102	C2
2106	J4
2107	J6
2108	L2
2109	L3
2120	K7
2122	M7
2123	L7
2125	L7
2127	H16
2128	I13
2129	I8
2130	J20
2131	I17
2132	I17
2133	G18
2134	G19
2135	F19
2136	H19
2137	G19
2138	H18
2139	I7
2140	C14
2141	H15
2142	K19
2143	K20
2144	K20
2145	E19
2147	E19
2148	E19
2150	C6
2151	H12
2152	I11
2158	L18
2160	I15
2161	I15
2162	H20
3103	G3
3104	G4
3107	C6
3108	J1
3109	K1
3120	H5
3123	I6
3124	K7
3125	L11
3128	L9
3129	K8
3130	K8
3131	M10
3132	J7
3134	L6
3137	L5
3140	F7
3141	I16
3142	I16
3143	K17
3144	K17
3145	I17
3146	L20
3147	N20
3150	H19
3151	I20
3152	F20
3153	G20
3154	J20
3155	J20
3158	E19
3159	E19
3160	D19
3161	D19
3162	I15
3163	J8
3164	I20
3167	I20
3169	L5
3172	B6
3173	B6
3177	M10
3178	N20
3181	C7
3183	I13
3184	I8
3185	I13
3186	K16
3188	M20
3192	C12
3197	L11
5102	I3
5103	L4
5107	J12
5109	B6
5110	C9
5111	C11
5112	C12
5114	C13
5115	J15
5121	I15
5122	L7
5123	K7
6105a	I5
6105b	I6
6106	H5
6107	K20
6120	E17
7101	C15
7103	K17
7104	J2
7105	K2
7109	L10
7110	I19
7122	L9
7124	L6

TUNER 95

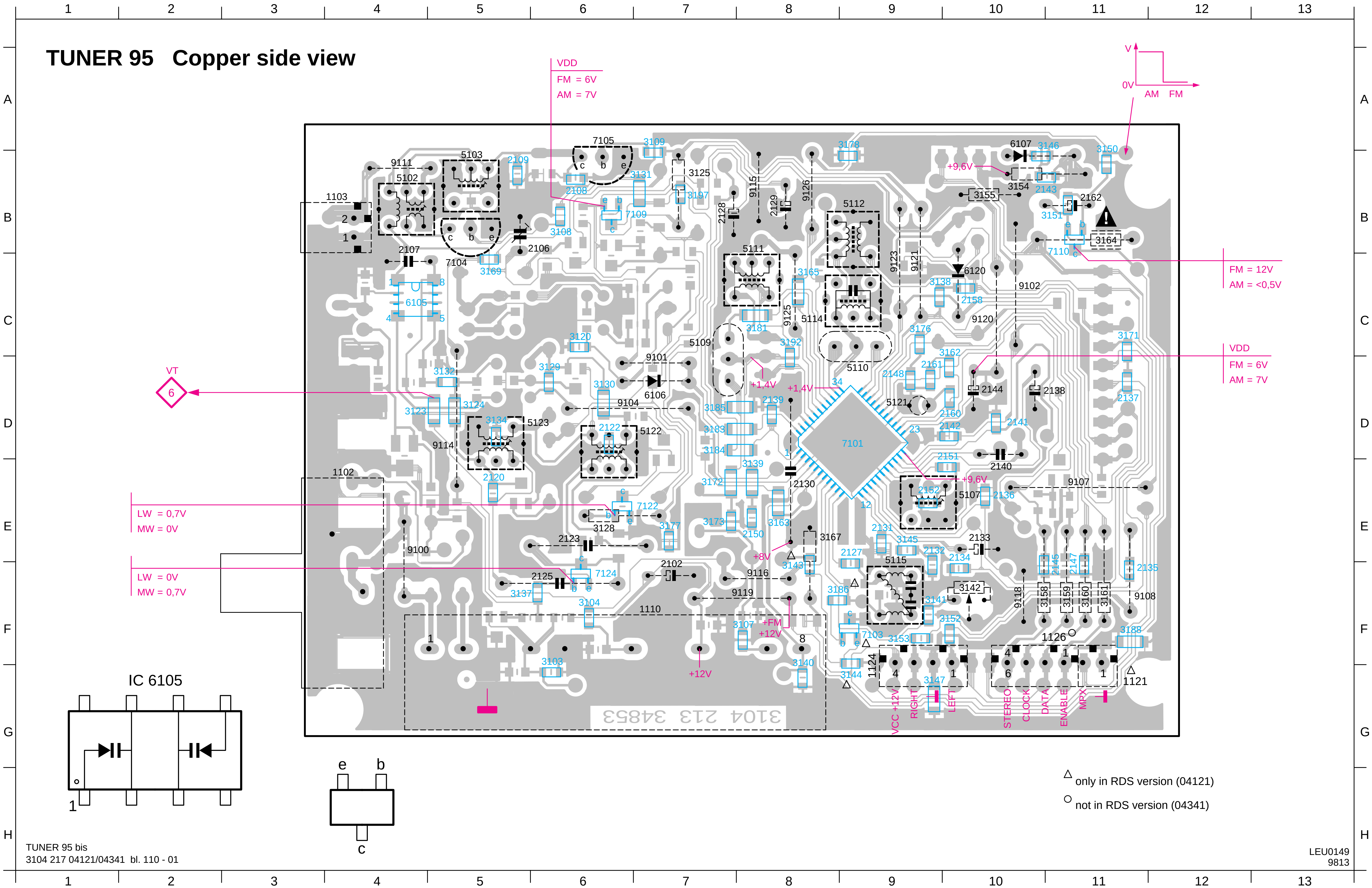

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
A B C D E F G H I J K L M N
FM FRONTEND
<0,5V
+12V
+FM
2102 470u
1110
FE415-G23
+B
IF Out
FM ANT.
1102
Ant1
Fa
Fif 10,7 MHz
Fo
GND
Osc Out
Fo = Fa + Fif
AGC MT VT
MT
3103 0E
3104 1k
3140 330E
3172 0E
5109 10,7 MHz
3173 0E
3107 82E
2150 100n
3181 0E
A
B
C
6
1103
AM-FRAME SOCKET
6106 1N4148
3120 0E
VT
IF - AM
IF - AM
AM - DET
5110 10,7 MHz
5111 450 kHz
5112 450 kHz
5114 450 kHz
3192 0E
2140 470n
1
2
+8V VCC1
+7V
+6V
VDD
1,4V
7101
TEA5762
+9,6V VCC2
VCC1 VDD FM-IF2 V Stab B FM-IF2I V Stab A AM-MIX Out AM-IF1 In AM-IF2 AM-AFC AFC- AFC+ VCC2
STABILIZER
AFC
37 FM-IF1I In
FM IF1
FM IF2
AM IF
AM DET
5 FM Osc.
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
FM DET
8 I-Tune
2 AM-RF
AGC
XTAL OSC
CONTROL
STEREO DECODER
WRITE Enable 29
DATA 28
CLOCK 27
P1 31
FM/AM 39
P0 30
Mono/ Stereo 24
Left 14
Mute 13
Right 15
PILOT Filter 16
Ripple AM-Osc. FM GND RF GND IF GND Dig. GND RF GND FM-Demod AGC AF-Out Fieldstrength Indc. MPX-In VC0 LPF
2V 1 6 3 4 17 26 42 18 0V 44 10 2V 21 25 11 1V 9 0,8V 12
0,7V
0,9V
2133 1µ
2138 2µ2
2139 100n
3184 0E
2129 1µ
2151 15p
2152 82p
MT
5107 Toko 7KM
3183 0E
2128 10µ
3185 0E
2141 100n
3162 150k
2160 12p
2161 1n
5121 75 kHz
2127 220n
3141 56k
3142 100k
3145 2k2
2132 470n
2131 470n
VC0
75 kHz
5115
ANTI BIRDY FILTER
7
V 0 0V = No communication
During communication
V 0V mono stereo
V 0 High = During communication
1121
GND
1,3V
MPX-RDS (VCC2)
ENABLE
DATA
CLOCK
STEREO
3161 470E
3160 470E
3159 470E
3158 470E
6120 1N4148
2145 220p
2147 220p
2148 22n
1126
3
STEREO = LOW
1124
LEFT
GND
RIGHT
2135 220n
3152 470E
2134 15n
4
2137 220n
3153 470E
2136 15n
11,8V
11,2V
3150 4k7
3151 68k
2162 22µ
V 0V AM FM
<0,5V
+12V
+FM
7110 BC858B
4E7 3164
VCC1 +8V
3167 220E
2130 22n
3154 150E
VCC +12V
VDD
+7V
+6V
3155 330E
2144 1µ
VCC2 +9,6V
2142 100n
2143 220n
6107 BZX79/ C11
3146 47E
+8V VCC1
7103 BC858C
3186 1k
3143 22k
3144 1k
1,3V
2158 100n
LW = 0,7V MW = 0V
3108 2k2
7104 BC338-40
MW
5102
2106 5p2- 30p
6105a HN1V02H
6105b HN1V02H
3123 0E
2107 470n
3132 0E
3124 0E
MW-OSC
5123
2120 33p
3134 22k
2125 560p
LW-OSC
5122
2123 390p
2122 3n9
3163 0E
3129 0E
3130 0E
7105 BC338-40
3109 2k2
2108 82p
2109 22p
5103
LW
LW = 0V MW = 0,7V
3169 0E
3137 10k
7124 BC848C
V 0V MW LW
7122 BC848C
LW = 0,7V MW = 0V
3128 2k2
3177 22k
3131 0E
+7V +6V VDD
+7V +6V VDD
3197 4k7
3125 10k
7109 BC858B
V 0V MW LW
V 0V MW LW
.....V FM mode stereo
.....V FM
.....V AM
Signal path
FM
AM
AF
only in RDS version (04121)
not in RDS version (04341)
3188 0E
3178 0E
3147 0E

3104 217 04120 bl. 130 - 01
3104 217 04121/04341 bl. 130 - 01

LEU0150
ITCL/9851-9813

1102	E4	2107	B4	2128	B7	2136	F10	2144	D10	2160	D9	3120	C6	3132	D5	3143	F8	3153	F9	3163	E8	3176	C9	3188	F11	5111	B8	6106	D7	7110	C11	9108	F11	9121	C9
1103	B4	2108	B6	2129	B8	2137	D11	2145	F11	2161	D9	3123	D4	3134	D5	3144	G9	3154	B10	3164	B11	3177	E7	3192	C8	5112	B9	6107	A10	7122	E7	9111	B4	9123	C9
1110	F7	2109	B5	2130	E8	2138	D10	2147	F11	2162	B11	3124	D5	3137	F5	3145	E9	3155	B10	3165	C8	3178	A8	3197	B7	5114	C8	6120	C10	7124	F6	9114	D5	9125	C8
1121	G11	2120	E5	2131	E9	2139	D8	2148	D9	3103	G6	3125	B7	3138	C9	3146	A10	3158	F11	3167	E8	3181	C8	5102	B4	5115	F9	7101	D9	9100	E4	9115	B8	9126	B8
1124	G9	2122	D6	2132	E9	2140	E10	2150	E8	3104	F6	3128	E6	3139	E8	3147	G9	3159	F11	3169	C5	3183	D7	5103	B5	5121	D9	7103	F9	9101	D7	9116	F8		
1126	F10	2123	E6	2133	E10	2141	D10	2151	E9	3107	F7	3129	D6	3140	G8	3150	B11	3160	F11	3171	C11	3184	D7	5107	E10	5122	D7	7104	C5	9102	C10	9118	F10		
2102	F7	2125	F6	2134	F10	2142	D9	2152	E9	3108	B6	3130	D6	3141	F9	3151	B10	3161	F11	3172	E7	3185	D7	5109	C7	5123	D5	7105	A6	9104	D6	9119	F7		
2106	B5	2127	E9	2135	F11	2143	B10	2158	C10	3109	A7	3131	B6	3142	F10	3152	F9	3162	C9	3173	E7	3186	F8	5110	D9	6105	C4	7109	B6	9107	E11	9120	C10		

TUNER 95 Copper side view


1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H
VDD
FM = 6V
AM = 7V
V
0V
AM FM
FM = 12V
AM = <0,5V
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
+9,6V
+1,4V
+1,4V
+9,6V
+8V
+FM
+12V
+12V
7101
6105
VCC +12V
RIGHT
LEFT
STEREO
CLOCK
DATA
ENABLE
MPX
3104 213 34853
IC 6105
1
e b
c

△ only in RDS version (04121)

○ not in RDS version (04341)

MISCELLANEOUS

1102	4822 267 10283	SOCKET COAX, IEC 75Ω
1103	4822 265 31184	JST CONNECTOR 2 POLE
1110	4822 210 10492	FRONTEND ASSY /02/08
1110	4822 210 10739	FM-FRONTEND FE415-G23

CAPACITORS

2102	4822 124 80791	470µF	20%	16V
2106	4822 125 60102	30pF TRIMCAP		
2107	4822 121 51252	470nF	5%	63V
2108 ©	4822 126 13695	82pF	1%	63V
2109 ©	5322 122 32658	22pF	5%	50V
2120 ©	5322 122 32659	33pF	5%	50V
2122 ©	5322 126 10465	3,9nF	10%	63V
2123	4822 121 10766	390pF	1%	630V
2125	4822 121 10578	560pF	1%	630V
2127 ©	4822 122 32927	220nF	10%	63V
2128	4822 124 41579	10µF	20%	50V
2129	4822 124 40242	1µF	20%	63V
2130	4822 126 11585	22nF	20%	50V
2131 ©	4822 122 33325	470nF	20%	50V
2132 ©	4822 122 33325	470nF	20%	50V
2133	4822 124 40242	1µF	20%	63V
2134 ©	4822 126 13188	15nF	5%	63V
2135 ©	4822 122 32927	220nF	10%	63V
2136 ©	4822 126 13188	15nF	5%	63V
2137 ©	4822 122 32927	220nF	10%	63V
2138	4822 124 41576	2,2µF	20%	50V
2140	4822 121 51252	470nF	5%	63V
2141 ©	4822 122 31947	100nF	20%	50V
2142 ©	4822 122 31947	100nF	20%	50V
2143 ©	4822 122 32927	220nF	10%	63V
2144	4822 124 40242	1µF	20%	63V
2145 ©	4822 122 33575	220pF	5%	50V
2147 ©	4822 122 33575	220pF	5%	50V
2148 ©	4822 122 33575	220pF	5%	50V
2150 ©	4822 122 31947	100nF	20%	50V
2158 ©	4822 122 31947	100nF	20%	50V
2160 ©	4822 122 32139	12pF	5%	63V
2161 ©	5322 122 34123	1nF	10%	50V
2162	4822 124 81151	22µF	20%	50V

RESISTORS

3090	4822 116 52206	120Ω	5%	0,5W
3091	4822 116 52206	120Ω	5%	0,5W
3092	4822 116 52219	330Ω	5%	0,5W
3102 ©	4822 117 13579	220kΩ	1%	0.1W
3103 ©	4822 051 20184	180kΩ	5%	0,1W
3104 ©	4822 051 10102	1kΩ	2%	0,25W
3107 ©	4822 051 20829	82Ω	5%	0,1W
3108 ©	4822 117 11449	2,2kΩ	1%	0,1W
3109 ©	4822 117 11449	2,2kΩ	1%	0,1W
3120 ©	4822 051 20008	CHIP JUMPER 0805		
3123 ©	4822 051 10008	CHIP JUMPER 1206		
3124 ©	4822 051 10008	CHIP JUMPER 1206		
3125	4822 116 83864	10kΩ	5%	0,5W
3128	4822 116 52256	2,2kΩ	5%	0,16W
3129 ©	4822 051 20008	CHIP JUMPER 0805		
3130 ©	4822 051 10008	CHIP JUMPER 1206		
3131 ©	4822 051 10008	CHIP JUMPER 1206		
3132 ©	4822 051 20008	CHIP JUMPER 0805		
3134 ©	4822 051 20223	22kΩ	5%	0,1W
3137 ©	4822 117 10833	10kΩ	1%	0,1W

RESISTORS

3140 ©	4822 051 20331	330Ω	5%	0,1W
3141 ©	4822 117 11148	56kΩ	1%	0,1W
3142	4822 100 11163	100kΩ TRIMPOT LIN.		
3143 ©	4822 051 20223	22kΩ	5%	0,1W
3144 ©	4822 051 10102	1kΩ	2%	0,25W
3145 ©	4822 117 11449	2,2kΩ	1%	0,1W
3146 ©	4822 051 20479	47Ω	5%	0,1W
3150 ©	4822 051 20472	4,7kΩ	5%	0,1W
3151 ©	4822 051 20683	68kΩ	5%	0,1W
3152 ©	4822 051 20471	470Ω	5%	0,1W
3153 ©	4822 051 20471	470Ω	5%	0,1W
3154	4822 116 83868	150Ω	5%	0,5W
3155	4822 116 52219	330Ω	5%	0,5W
3158	4822 116 83883	470Ω	5%	0,16W
3159	4822 116 83883	470Ω	5%	0,16W
3160	4822 116 83883	470Ω	5%	0,16W
3161	4822 116 83883	470Ω	5%	0,16W
3162 ©	4822 117 13579	220kΩ	1%	0.1W
3163 ©	4822 051 10008	CHIP JUMPER 1206		
3164	4822 052 10478	4,7Ω	5%	NFR
3167	4822 116 83872	220Ω	5%	0,5W
3169 ©	4822 051 20008	CHIP JUMPER 0805		
3172 ©	4822 051 10008	CHIP JUMPER 1206		
3181 ©	4822 051 10008	CHIP JUMPER 1206		
3183 ©	4822 051 10008	CHIP JUMPER 1206		
3184 ©	4822 051 10008	CHIP JUMPER 1206		
3185 ©	4822 051 10008	CHIP JUMPER 1206		
3186 ©	4822 051 10102	1kΩ	2%	0,25W
3188 ©	4822 051 10008	CHIP JUMPER 1206		
3191 ©	4822 117 10353	150Ω	5%	0,1W
3192 ©	4822 051 20008	CHIP JUMPER 0805		
3197 ©	4822 051 20472	4,7kΩ	5%	0,1W

COILS

5102	4822 157 71634	RF-COIL MW
5103	4822 157 71635	RF-COIL LW
5109	4822 157 71639	FM-IF FILTER 10,7MHz
5110	4822 242 70665	FM-IF FILTER 10,7MHz
5111	4822 158 60511	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 70302	AM-IF FILTER 450kHz
5115	4822 157 71636	ANTI BIRDY FILTER
5120	4822 242 10251	CER. DISCR. 10.7MG61KA-TF21
5121	4822 242 10261	QUARTZ 75kHz
5122	4822 157 60517	RF-COIL AM
5123	4822 157 60517	RF-COIL AM

DIODES

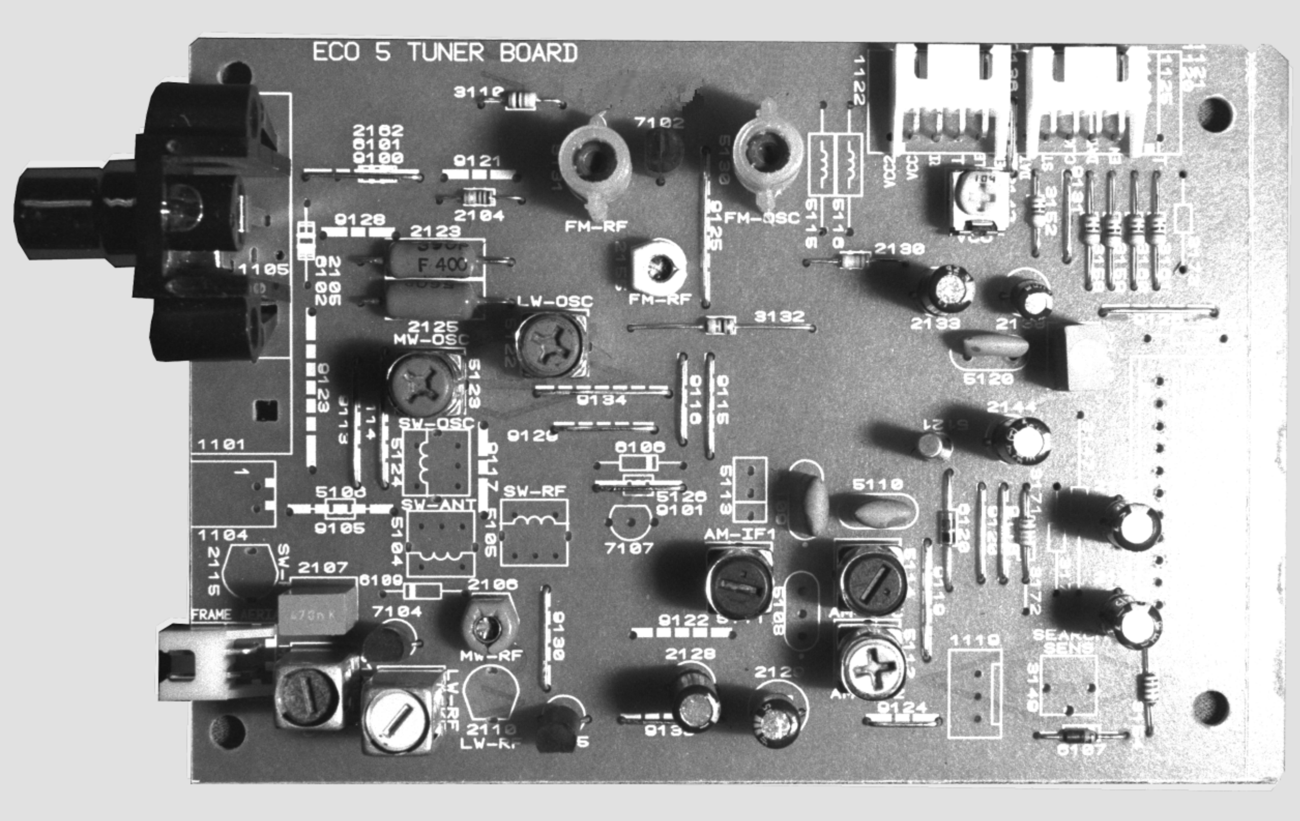
6105 ©	4822 130 83075	HN1V02H
6106	4822 130 30621	1N4148
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148

TRANSISTORS

7103 ©	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109 ©	5322 130 41983	BC858B
7110 ©	5322 130 41983	BC858B
7122 ©	5322 130 42136	BC848C
7124 ©	5322 130 42136	BC848C

INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1, RADIO IC


ECO 5 TUNER BOARD
FM-RF
FM-OSC
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
AM-IF1
MW-RF
LW-RF
FRAME AERIAL
SEARCH SENS
1101
1104
1105
1119
1122
7102
7104
7107
2123
2125
2128
2130
2133
2144
3110
3132
5110
5120

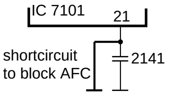
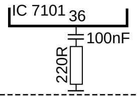
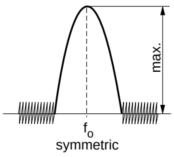
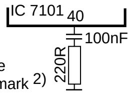
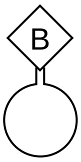
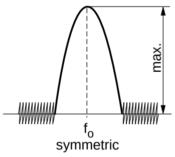
Tuner ECO 5

(3 Band Tuner)

TABLE OF CONTENTS

Adjustment table 7B-2
Blockdiagram 7B-3
Circuit Diagram 7B-4
Component Layout...7B-5
Electrical Partslist...7B-6

TUNER ADJUSTMENT TABLE (**ECO5** FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	◇ 1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 50mV continuous wave	◇ F		5119	◇ 2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	◇ A	108MHz	2155	◇ 4	MAX ↕
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	◇ A	98MHz	3142	◇ 3	152kHz ±1kHz 1)
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	◇ C		5111	◇ 4	
		Δf=±15kHz V_{RF} = 3mV	see remark 2) 	5112		
AM AFC **MW**		◇ C continuous wave V_{RF} = 10mV		5114	◇ 2	0 ± 2 mV DC
AM RF 3)						
MW 4) FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz		1494kHz	2106	◇ 4	 ↕
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz	Δf = ±30kHz V_{RF} as low as possible	1500kHz	2106		↕
	560kHz		560kHz	5102		

ECO5, discr. coil, 090797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

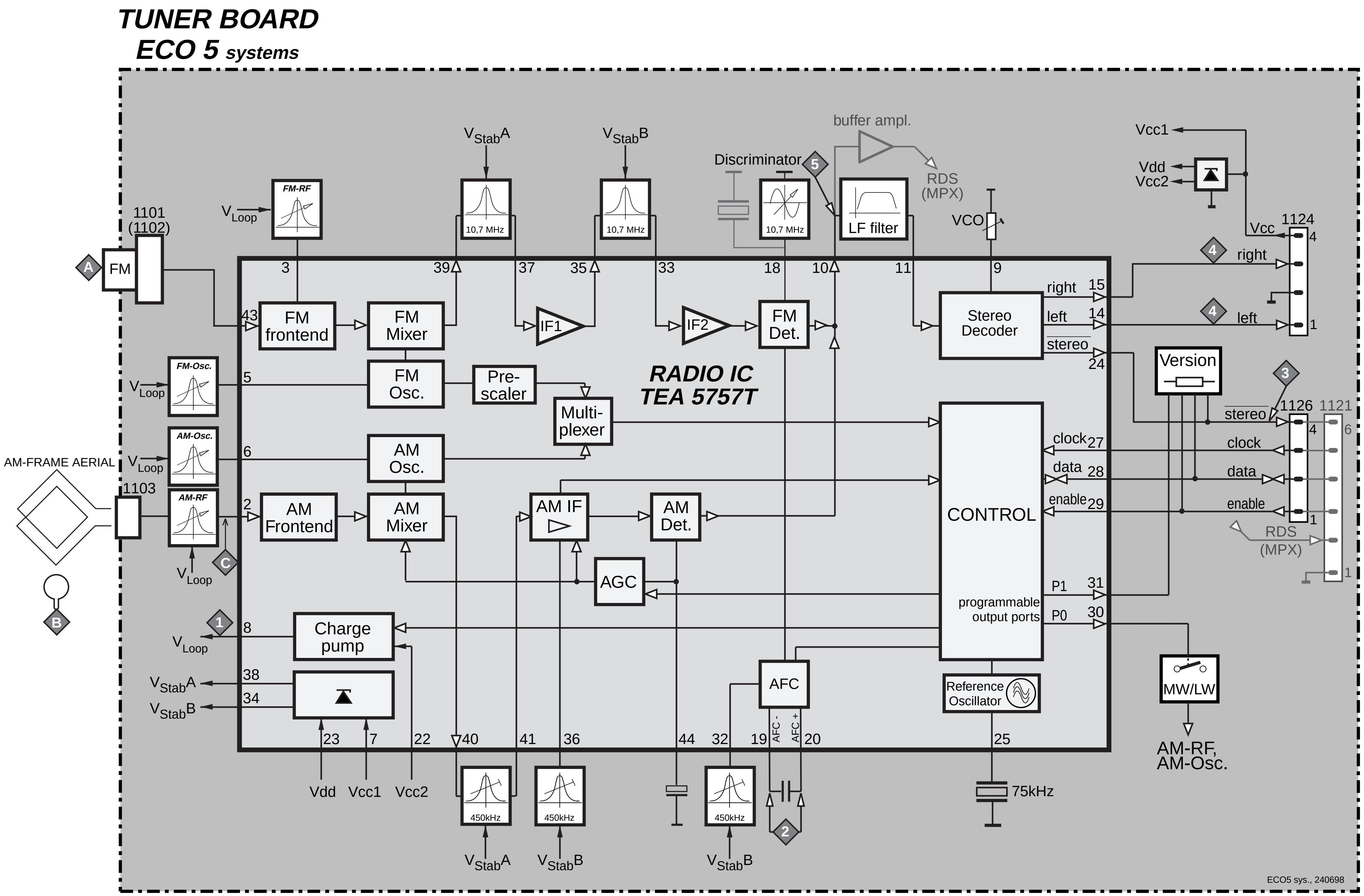
2) RC network serves for damping the IF-filter while adjusting the other one.

3) For AM RF adjustments the original frame antenna has to be used !

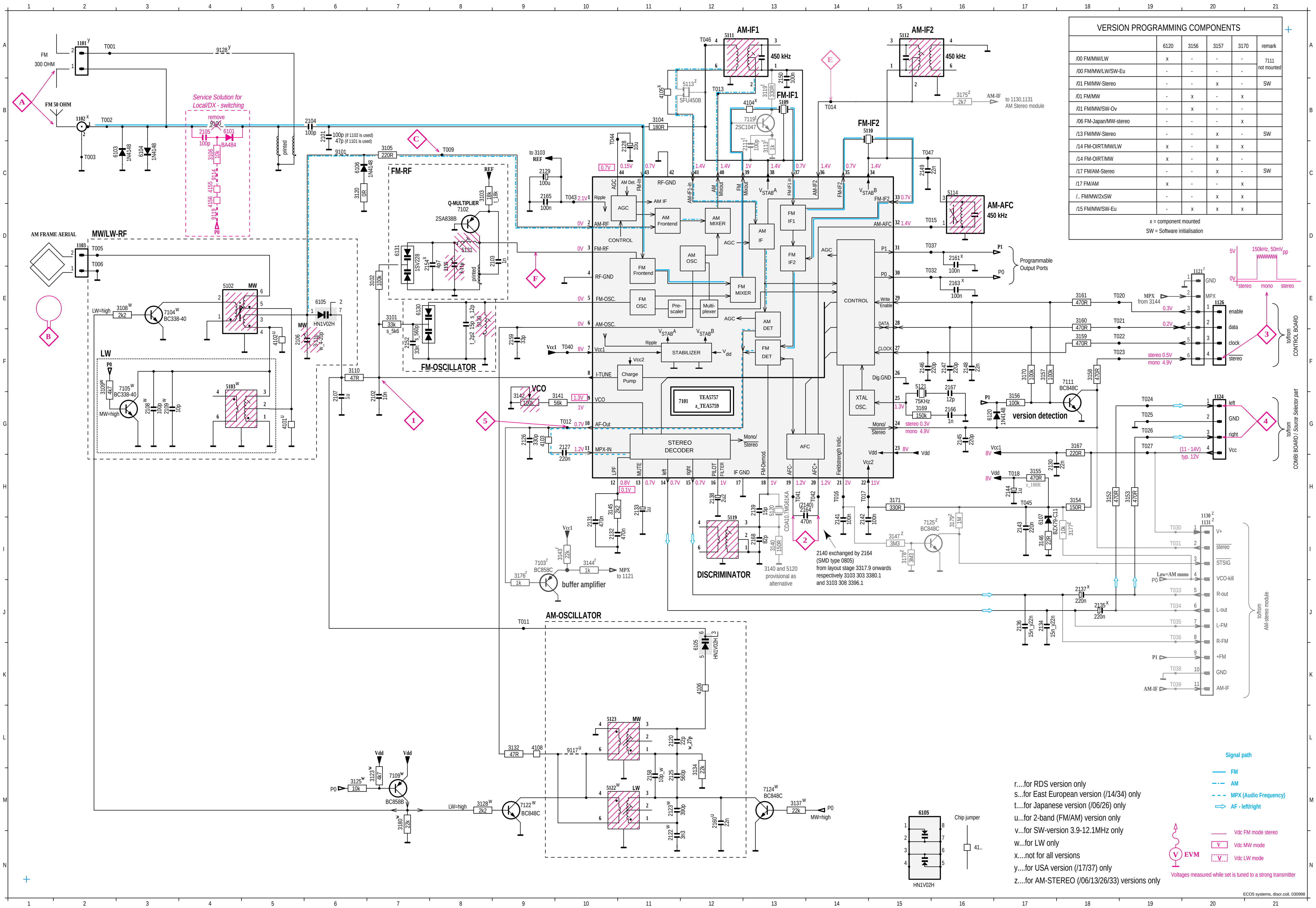
4) MW has to be aligned before LW.

↕ Repeat

BLOCK DIAGRAM TUNER ECO5


TUNER BOARD
ECO 5 systems
RADIO IC
TEA 5757T
1101
(1102)
FM
A
VLoop
FM-RF
VStabA
VStabB
10,7 MHz
Discriminator
5
buffer ampl.
RDS
(MPX)
LF filter
VCO
Vcc1
Vdd
Vcc2
Vcc
1124
4
right
left
1
3
39
37
35
33
18
10
11
9
43
FM frontend
FM Mixer
IF1
IF2
FM Det.
Stereo Decoder
right 15
left 14
stereo 24
Version
3
1126
1121
6
FM-Osc.
5
FM Osc.
Pre-scaler
Multi-plexer
AM-Osc.
6
AM Osc.
AM-FRAME AERIAL
1103
AM-RF
2
AM Frontend
AM Mixer
AM IF
AM Det.
CONTROL
clock 27
data 28
enable 29
clock
data
enable
stereo
C
AGC
B
1
8
Charge pump
38
34
P1 31
P0 30
programmable output ports
MW/LW
AM-RF,
AM-Osc.
AFC
AFC -
AFC +
Reference Oscillator
23
7
22
40
41
36
44
32
19
20
25
Vdd
Vcc1
Vcc2
450kHz
75kHz
2
ECO5 sys., 240698

TUNER BOARD ECO5 / Systems


FM 300 OHM
FM 50 OHM
AM FRAME AERIAL
MW/LW-RF
LW
Service Solution for Local/DX - switching
remove
FM-RF
Q-MULTIPLIER 7102 2SA838B
FM-OSCILLATOR
VCO
AM-IF1
AM-IF2
FM-IF1
FM-IF2
AM-AFC 450 kHz
450 kHz
SFU450B
2SC1047
7101 TEA5757 z_TEA5759
CONTROL
STEREO DECODER
STABILIZER
Charge Pump
AM Frontend
AM MIXER
AM OSC
AM IF
FM Frontend
FM OSC
FM MIXER
Pre-scaler
Multi-plexer
AM DET
FM DET
FM IF1
FM IF2
AFC
XTAL OSC.
DISCRIMINATOR
buffer amplifier
AM-OSCILLATOR
version detection
Programmable Output Ports
to 1130,1131 AM Stereo module
to/from CONTROL BOARD
to/from COMBI BOARD / Source Selector part
to/from AM-stereo module
150kHz, 50mVpp
5V
0V
stereo
mono
stereo
2140 exchanged by 2164 (SMD type 0805) from layout stage 3317.9 onwards respectively 3103 303 3380.1 and 3103 308 3396.1
3140 and 5120 provisional as alternative
Chip jumper
6105 HN1V02H
Signal path
FM
AM
MPX (Audio Frequency)
AF - left/right
EVM
Vdc FM mode stereo
Vdc MW mode
Vdc LW mode
Voltages measured while set is tuned to a strong transmitter
A
B
C
D
E
F
1
2
3
4
5

VERSION PROGRAMMING COMPONENTS	6120	3156	3157	3170	remark
/00 FM/MW/LW	x	-	-	-	7111 not mounted
/00 FM/MW/LW/SW-Eu	-	-	-	-	
/01 FM/MW-Stereo	-	-	x	-	SW
/01 FM/MW	-	x	-	x	
/01 FM/MW/SW-Ov	-	x	-	-	
/06 FM-Japan/MW-stereo	-	-	-	x	
/13 FM/MW-Stereo	-	-	x	-	SW
/14 FM-OIRT/MW/LW	x	-	x	x	
/14 FM-OIRT/MW	x	-	x	-	
/17 FM/AM-Stereo	-	-	x	-	SW
/17 FM/AM	x	-	-	x	
/.. FM/MW/2xSW	-	-	x	x	
/15 FM/MW/SW-Eu	-	x	x	x	

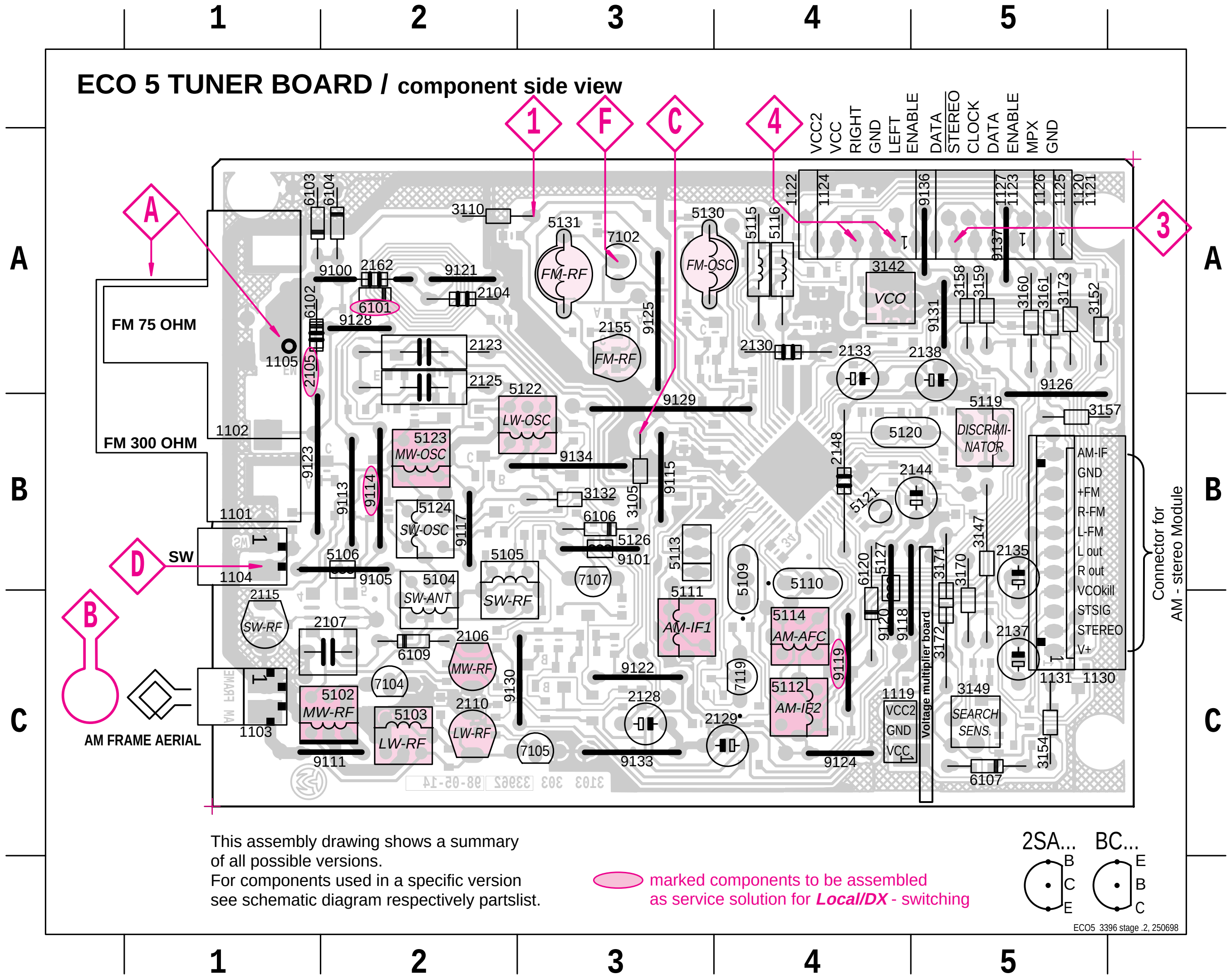
x = component mounted
SW = Software initialisation

r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

ECO5 systems, discr.coil, 030998

1101	A 1
1102	B 2
1103	D 2
1121	E20
1124	G20
1126	E20
1130	I20
1131	I20
2101	C 6
2102	G 7
2103	D 9
2104	B 6
2106	F 5
2107	G 6
2108	G 3
2109	G 3
2111	C13
2120	L11
2122	N11
2123	M11
2125	M11
2126	G 9
2127	G10
2128	C11
2129	C 9
2130	H17
2131	I10
2132	I10
2133	H11
2134	J17
2135	J18
2136	J17
2137	J18
2138	H12
2139	H13
2140	H14
2141	H14
2142	H14
2143	I17
2144	H17
2145	G16
2146	F15
2147	F16
2148	F16
2149	C15
2150	B13
2152	F 7
2153	E 8
2154	E 7
2155	D 8
2158	M11
2159	F 9
2160	M12
2161	D16
2163	E16
2164	H14
2165	C 9
2166	G16
2167	F16
2168	I 13
3101	E 7
3102	E 7
3103	C 8
3104	B11
3105	C 7
3108	E 3
3109	F 2
3110	F 6
3113	C13
3119	B13
3120	C 6
3123	M 7
3125	M 6
3128	M 8
3132	L 9
3134	M12
3137	M13
3140	I13
3141	G10
3142	G 9
3143	I10
3144	I10
3145	H10
3146	I17
3147	I15
3152	H18
3153	H19
3154	H18
3155	H17
3156	G17
3157	F17
3158	F18
3159	F18
3160	E18
3161	E18
3167	G18
3169	G15
3170	F17
3171	H15
3175	B16
3176	J 9
3177	I18
3178	I15
3179	I16
3180	M7
4101	G 5
4102	F 5
4103	G 9
4104	B13
4105	B11
4106	K12
4108	L 9
5102	E 4
5103	F 4
5109	B13
5110	B14
5111	A13
5112	A15
5113	B12
5114	C16
5119	I 12
5120	H13
5121	F15
5122	M11
5123	L11
5130	E 8
5131	D 8
6103	C 2
6104	C 3
6105	K12
6105	E 6
6106	C 6
6107	H17
6120	G16
6130	E 7
6131	D 7
7101	G11
7102	D 8
7103	I 9
7104	E 3
7105	F 2
7109	M 7
7111	F18
7119	B13
7122	M 9
7124	M13
7125	I16
9100	B 4
9101	C 6
9117	L10
9128	A 4

1101	A1	2106	C2	2137	C5	3149	C5	3173	A5	5114	C4	5130	A3	7104	C2	9117	B2	9129	B3
1102	A1	2107	C2	2138	A5	3152	A5	5102	C2	5115	A4	5131	A3	7105	C3	9118	B4	9130	C3
1103	C1	2110	C2	2144	B5	3154	C5	5103	C2	5116	A4	6101	A2	7107	B3	9119	C4	9131	A5
1104	B1	2115	C1	2148	B4	3157	B5	5104	C2	5119	B5	6102	A1	7119	C4	9120	B4	9133	C3
1105	A1	2123	A2	2155	A3	3158	A5	5105	B2	5120	B4	6103	A1	9100	A2	9121	A2	9134	B3
1119	C5	2125	A2	2162	A2	3159	A5	5106	B2	5121	B4	6104	A2	9101	B3	9122	C3	9136	A5
1120	A5	2128	C3	3105	B3	3160	A5	5109	B4	5122	B3	6106	B3	9105	B2	9123	B1	9137	A5
1130	B5	2129	C4	3110	A2	3161	A5	5110	B4	5123	B2	6107	C5	9111	C2	9124	C4		
1131	B5	2130	A4	3132	B3	3170	C5	5111	C3	5124	B2	6109	C2	9113	B2	9125	A3		
2104	A2	2133	A4	3142	A4	3171	C5	5112	C4	5126	B3	6120	C4	9114	B2	9126	B5		
2105	A1	2135	B5	3147	B5	3172	C5	5113	B3	5127	B4	7102	A3	9115	B3	9128	A2		

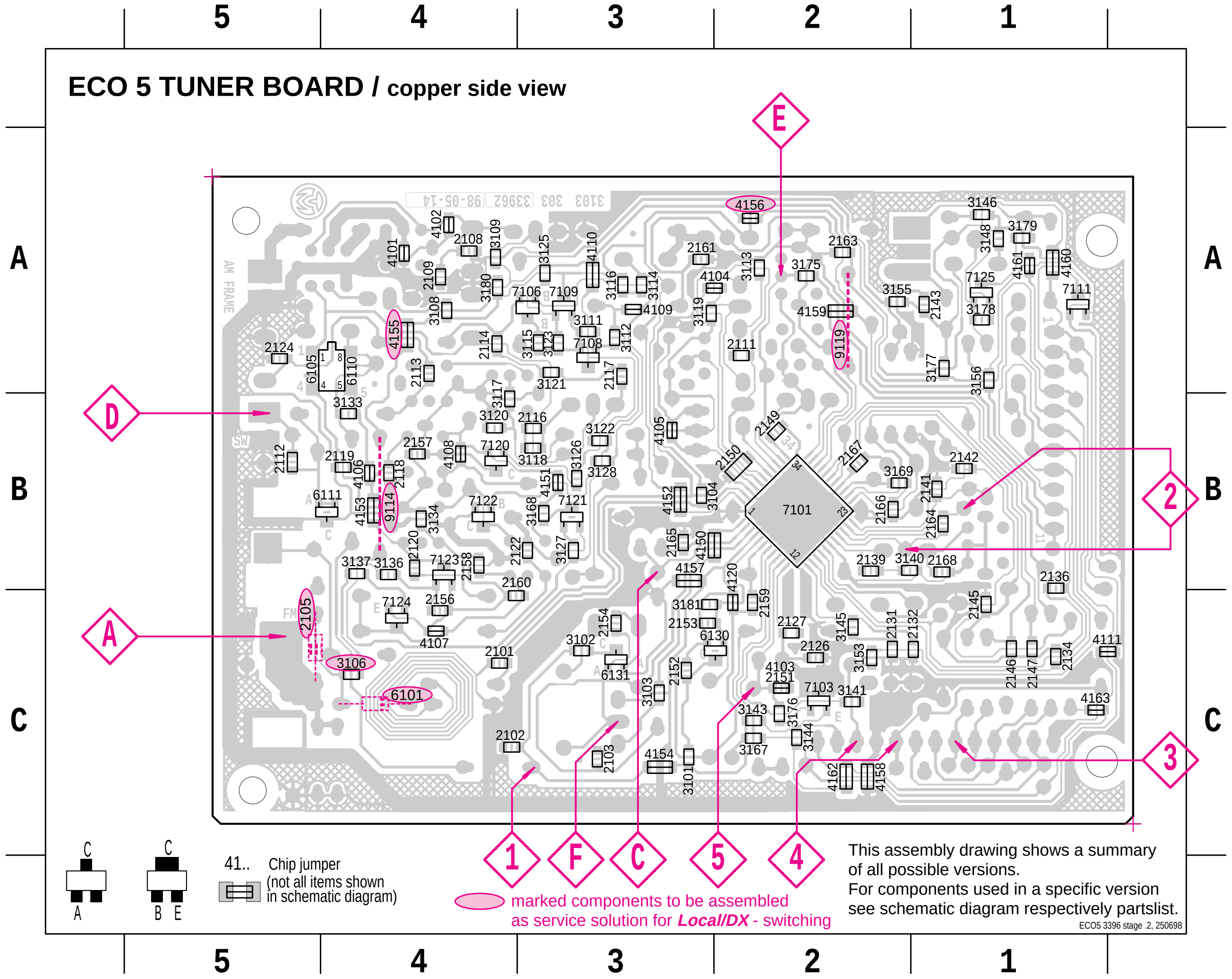

1
2
3
4
5
A
B
C
A
F
C
1
4
3
B
D
VCC2
VCC
RIGHT
GND
LEFT
ENABLE
DATA
STEREO
CLOCK
DATA
ENABLE
MPX
GND
FM 75 OHM
FM 300 OHM
SW
AM FRAME AERIAL
FM-RF
FM-OSC
VCO
MW-OSC
LW-OSC
SW-OSC
SW-ANT
SW-RF
MW-RF
LW-RF
AM-IF1
AM-AFC
AM-IF2
DISCRIMI-NATOR
SEARCH SENS.
AM-IF
GND
+FM
R-FM
L-FM
L out
R out
VCOkill
STSIG
STEREO
V+
Connector for AM - stereo Module
Voltage multiplier board
VCC2
GND
VCC
2SA...
BC...
B
C
E
E
B
C
ECO5 3396 stage 2, 250698

ECO 5 TUNER BOARD / component side view

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for ***Local/DX*** - switching

2101	C4	2120	B4	2145	C1	2160	C4	3108	A4	3122	B3	3144	C2	3178	A1	4110	A3	4160	A1	7109	A3
2102	C4	2122	B3	2146	C1	2161	A3	3109	A4	3123	A3	3145	C2	3179	A1	4111	C1	4161	A1	7111	A1
2103	C3	2124	A5	2147	C1	2163	A2	3111	A3	3125	A3	3146	A1	3180	A4	4120	C2	4162	C1	7120	B4
2108	A4	2126	C2	2149	B2	2164	B1	3112	A3	3126	B3	3148	A1	3181	C3	4150	B2	4163	C1	7121	B3
2109	A4	2127	C2	2150	B2	2165	B3	3113	A2	3127	B3	3153	C2	4101	A4	4151	B3	6105	A4	7122	B4
2111	A2	2131	C2	2151	C2	2166	B2	3114	A3	3128	B3	3155	A2	4102	A4	4152	B3	6110	A4	7123	B4
2112	B5	2132	C1	2152	C3	2167	B2	3115	A3	3133	B4	3156	A1	4103	C2	4153	B4	6111	B4	7124	C4
2113	A4	2134	C1	2153	C3	2168	B 1	3116	A3	3134	B4	3167	C2	4104	A2	4154	C3	6130	C2	7125	A1
2114	A4	2136	B1	2154	C3	3101	C3	3117	B4	3136	B4	3168	B3	4105	B3	4155	A4	6131	C3		
2116	B3	2139	B2	2156	C4	3102	C3	3118	B3	3137	B4	3169	B2	4106	B4	4156	A2	7101	B2		
2117	A3	2141	B1	2157	B4	3103	C3	3119	A3	3140	B2	3175	A2	4107	C4	4157	B3	7103	C2		
2118	B4	2142	B1	2158	B4	3104	B3	3120	B4	3141	C2	3176	C2	4108	B4	4158	C2	7106	A3		
2119	B4	2143	A1	2159	C2	3106	C4	3121	A3	3143	C2	3177	A1	4109	A3	4159	A2	7108	A3		


5
4
3
2
1
A
B
C
E
D
A
2
3
1
F
C
5
4
7101
C
A
C
B E
41..
Chip jumper
(not all items shown in schematic diagram)
ECO5 3396 stage 2, 250698

ECO 5 TUNER BOARD / copper side view

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for ***Local/DX*** - switching

MISCELLANEOUS

1101	4822 267 31505	SOCKET 2P CLICKFIT
1102	4822 267 10283	SOCKET COAX, IEC 75Ω
1103	4822 265 31184	JST CONNECTOR 2 POLE

CAPACITORS

2101 ©	4822 126 13692	47pF	1%	63V
2101 ©	5322 122 32531	100pF	5%	50V
2102 ©	4822 122 33177	10nF	20%	50V
2103 ©	5322 122 31647	1nF	10%	63V
2104	4822 122 33195	100pF	10%	50V
2106	4822 125 60101	3-11pF TRIMCAP		
2107	4822 121 51319	1µF	20%	50V
2120 ©	5322 122 32658	22pF	5%	50V
2125	4822 121 10673	560PF	1%	630V
2126 ©	5322 122 31863	330pF	5%	50V
2127 ©	4822 126 13473	220nF	20%	50V
2128	4822 124 40248	10µF	20%	63V
2129	4822 124 41584	100µF	20%	10V
2130	4822 126 11585	22nF	20%	50V
2131 ©	4822 126 13482	470nF	20%	16V
2132 ©	4822 126 13482	470nF	20%	16V
2133	4822 124 21913	1µF	20%	63V
2134 ©	4822 126 13188	15nF	5%	63V
2134 ©	5322 122 32654	22nF	10%	63V
2135	4822 124 40746	0,22µF	20%	63V
2136 ©	4822 126 13188	15nF	5%	63V
2136 ©	5322 122 32654	22nF	10%	63V
2137	4822 124 40746	0,22µF	20%	63V
2138	4822 124 22652	2,2µF	20%	50V
2139 ©	4822 126 14236	15pF	5%	50V
2141 ©	4822 126 13838	100nF	10%	50V
2142 ©	4822 126 13838	100nF	10%	50V
2143 ©	4822 126 13473	220nF	20%	50V
2144	4822 124 21913	1µF	20%	63V
2145 ©	4822 122 33575	220pF	5%	50V
2146 ©	4822 122 33575	220pF	5%	50V
2147 ©	4822 122 33575	220pF	5%	50V
2148	4822 126 11585	22nF	20%	50V
2149 ©	5322 122 32654	22nF	10%	63V
2150 ©	4822 122 33496	100nF	10%	63V
2152 ©	4822 126 12105	33nF	5%	63V
2153 ©	4822 126 13486	15pF	2%	63V
2155	4822 125 60101	3-11pF TRIMCAP		
2159 ©	5322 122 32659	33pF	5%	50V
2160 ©	5322 122 32654	22nF	10%	63V
2164 ©	4822 126 13482	470nF	20%	16V
2165 ©	4822 126 13838	100nF	10%	50V
2166 ©	5322 122 31647	1nF	10%	63V
2167 ©	4822 122 33926	12pF	5%	50V
2168 ©	4822 126 13695	82pF	1%	63V

RESISTORS

3101 ©	4822 051 20333	33kΩ	5%	0,1W
3102 ©	4822 117 10837	100kΩ	1%	0,1W
3103 ©	4822 117 10965	18kΩ	2%	0,1W
3104 ©	4822 117 11448	180Ω	10%	0,1W
3105	4822 116 83872	220Ω	5%	0,5W
3110	4822 116 52195	47Ω	5%	0,5W
3120 ©	4822 051 20008	CHIP JUMPER 0805		
3132	4822 116 52195	47Ω	5%	0,5W
3134 ©	4822 051 20223	22kΩ	5%	0,1W
3141 ©	4822 117 11148	56kΩ	1%	0,1W

RESISTORS

3142	4822 100 12159	TRIMPOT. 100kΩ		
3145 ©	4822 117 11449	2,2kΩ	1%	0,1W
3146 ©	4822 051 20229	22Ω	5%	0,1W
3152	4822 116 83883	470Ω	5%	0,16W
3153 ©	4822 051 20471	470Ω	5%	0,1W
3154	4822 116 83868	150Ω	5%	0,5W
3155 ©	4822 051 20471	470Ω	5%	0,1W
3156 ©	4822 117 10837	100kΩ	1%	0,1W
3158	4822 116 83883	470Ω	5%	0,16W
3159	4822 116 83883	470Ω	5%	0,16W
3160	4822 116 83883	470Ω	5%	0,16W
3161	4822 116 83883	470Ω	5%	0,16W
3167 ©	4822 117 11503	220Ω	5%	0,1W
3169 ©	4822 051 20154	150kΩ	5%	0,1W
3170	4822 116 52234	100kΩ	5%	0,5W
3171	4822 116 52219	330Ω	5%	0,5W
4101 ©	4822 051 20008	CHIP JUMPER 0805		
4102 ©	4822 051 20008	CHIP JUMPER 0805		
4103 ©	4822 051 20008	CHIP JUMPER 0805		
4104 ©	4822 051 20008	CHIP JUMPER 0805		
4105 ©	4822 051 20008	CHIP JUMPER 0805		
4106 ©	4822 051 20008	CHIP JUMPER 0805		
4108 ©	4822 051 20008	CHIP JUMPER 0805		
4111 ©	4822 051 20008	CHIP JUMPER 0805		
4120 ©	4822 051 20008	CHIP JUMPER 0805		
4150 ©	4822 051 20008	CHIP JUMPER 0805		
4152 ©	4822 051 20008	CHIP JUMPER 0805		
4153 ©	4822 051 20008	CHIP JUMPER 0805		
4154 ©	4822 051 20008	CHIP JUMPER 0805		
4157 ©	4822 051 20008	CHIP JUMPER 0805		
4158 ©	4822 051 20008	CHIP JUMPER 0805		
4159 ©	4822 051 20008	CHIP JUMPER 0805		

COILS

5102	4822 157 71634	RF-COIL MW
5109	4822 242 70665	FM-IF FILTER 10,7MHz
5110	4822 242 70665	FM-IF FILTER 10,7MHz
5111	4822 158 60511	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 70302	AM-IF FILTER 450kHz
5119	4822 157 11443	DISCRIMINATOR COIL
5121	4822 242 10261	QUARTZ 75kHz
5123	4822 157 60517	RF-COIL AM
5130	4822 157 11843	RF COIL 1,5 TURNS
5131	4822 157 11843	RF COIL 1,5 TURNS

DIODES

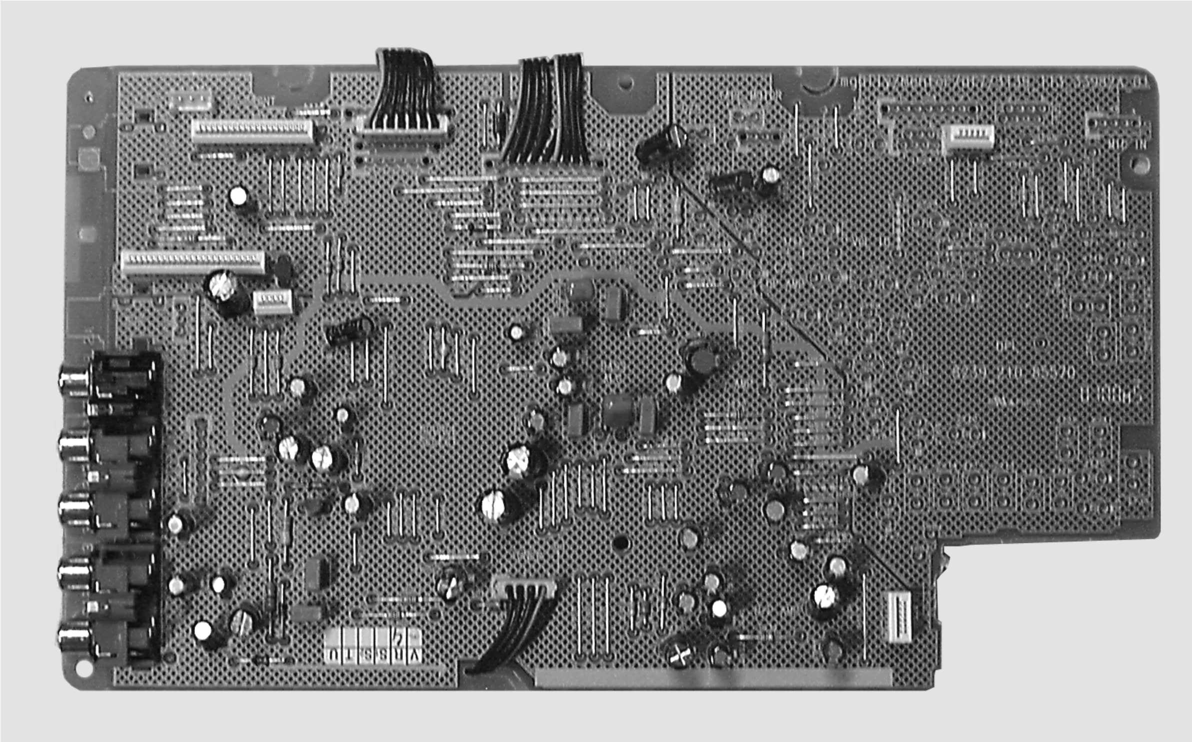
6103	4822 130 30621	1N4148
6104	4822 130 30621	1N4148
6105 ©	4822 130 83075	HN1V02H
6106	4822 130 30621	1N4148
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148
6130 ©	4822 130 82833	1SV228
6131 ©	4822 130 82833	1SV228

TRANSISTORS

7102	4822 130 60093	2SA838B
7111 ©	5322 130 42755	BC847C

INTEGRATED CIRCUITS

7101 ©	4822 209 90924	TEA5757H/V1, RADIO IC



AF7 Board

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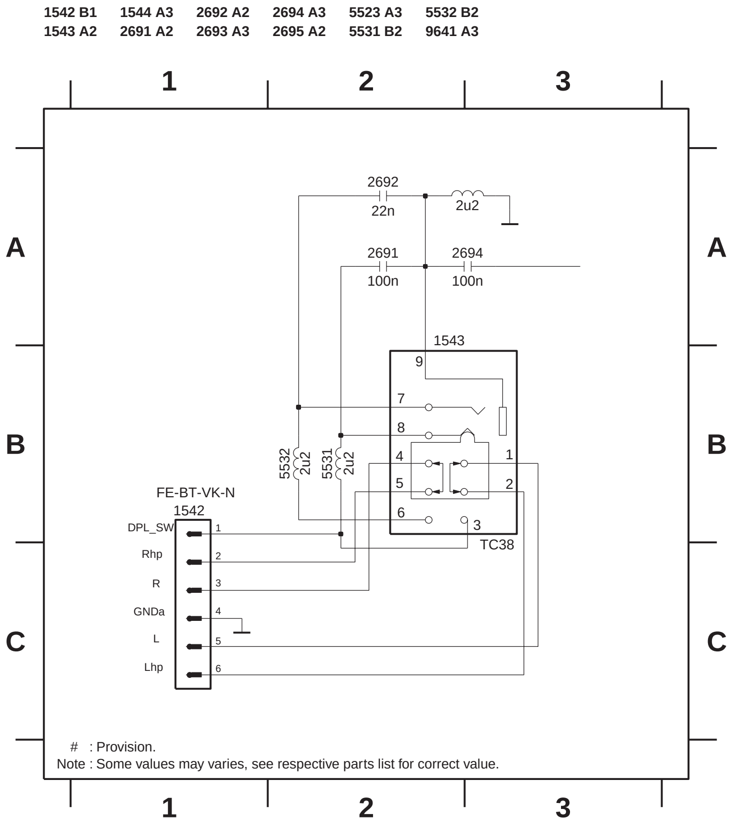
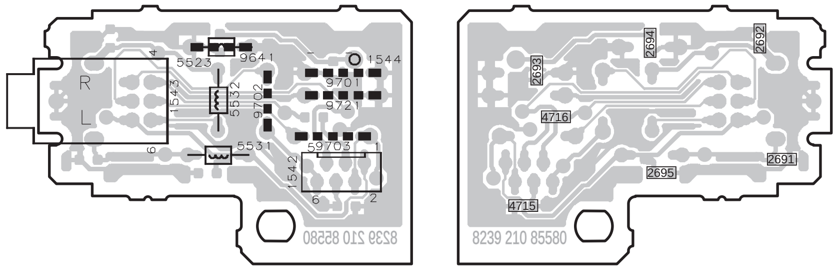
Component Layout Headphone Board 8-1
Circuit Diagram AF7 Bord...8-2
Component Layout AF7 Bord 8-4
Electrical Partslist 8-6



1542 B1
1543 A2
1544 A3
2691 A2
2692 A2
2693 A3
2694 A3
2695 A2
5523 A3
5531 B2
5532 B2
9641 A3
1
2
3
A
B
C
2692
22n
2u2
2691
100n
2694
100n
1543
5532
2u2
5531
2u2
FE-BT-VK-N
1542
DPL_SW
Rhp
R
GNDa
L
Lhp
TC38
# : Provision.
Note : Some values may varies, see respective parts list for correct value.

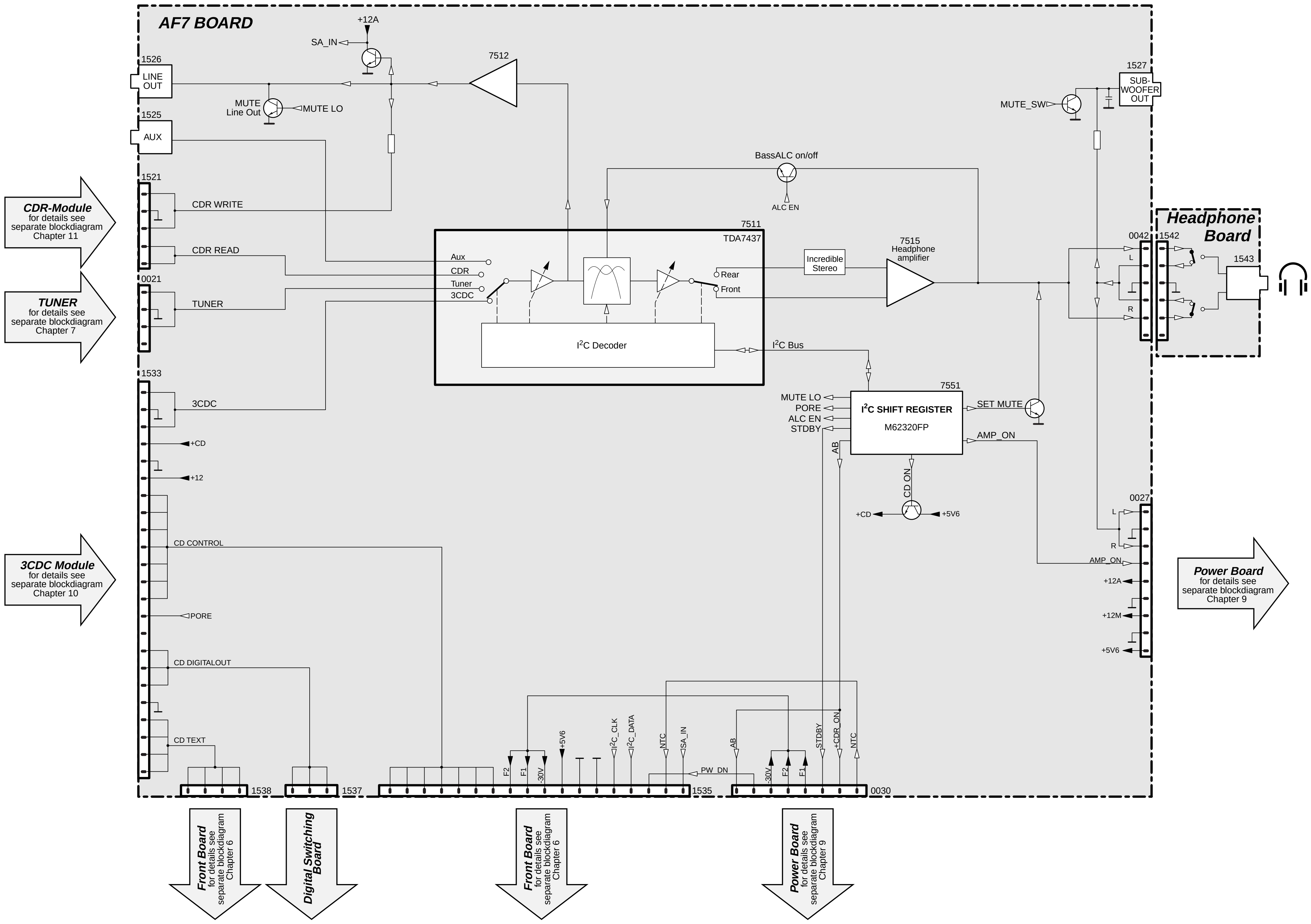
Headphone Board


Componentside view

Copperside view

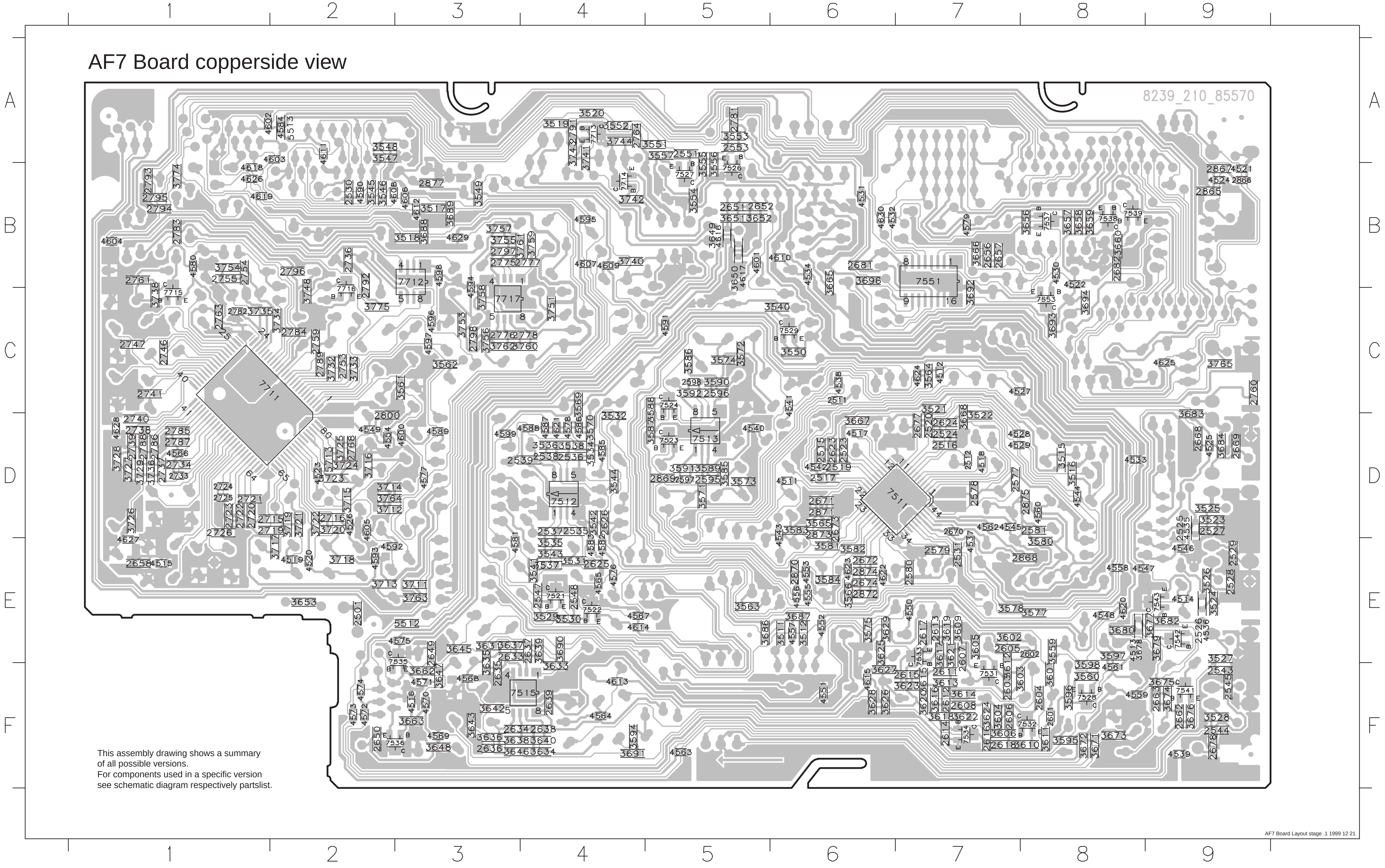
5523
9641
1544
1543
5532
9702
9701
9721
5531
9703
1542
8239 210 85580
2693
2694
2692
4716
2695
2691
4715
8239 210 85580

Blockdiagram AF7 Board


AF7 BOARD
+12A
SA_IN
1526
LINE OUT
1525
AUX
MUTE
Line Out
MUTE LO
7512
1521
CDR WRITE
CDR READ
0021
TUNER
1533
3CDC
+CD
+12
CD CONTROL
PORE
CD DIGITALOUT
CD TEXT
CDR-Module
for details see
separate blockdiagram
Chapter 11
TUNER
for details see
separate blockdiagram
Chapter 7
3CDC Module
for details see
separate blockdiagram
Chapter 10
BassALC on/off
ALC EN
7511
TDA7437
Aux
CDR
Tuner
3CDC
Rear
Front
I²C Decoder
I²C Bus
Incredible Stereo
7515
Headphone amplifier
7551
I²C SHIFT REGISTER
M62320FP
MUTE LO
PORE
ALC EN
STDBY
AB
SET MUTE
AMP_ON
CD ON
+CD
+5V6
1527
SUB-WOOFER OUT
MUTE_SW
Headphone Board
0042
1542
1543
L
R
0027
L
R
AMP_ON
+12A
+12M
+5V6
Power Board
for details see
separate blockdiagram
Chapter 9
F2
F1
-30V
+5V6
I²C_CLK
I²C_DATA
NTC
SA_IN
PW_DN
AB
-30V
F2
F1
STDBY
+CDR_ON
NTC
1538
1537
1535
0030
Front Board
for details see
separate blockdiagram
Chapter 6
Digital Switching Board
Front Board
for details see
separate blockdiagram
Chapter 6
Power Board
for details see
separate blockdiagram
Chapter 9

2501 E2	2545 F9	2613 E7	2662 F9	2734 D1	2783 B1	2873 D6	3534 D4	3560 F8	3588 C5	3617 E7	3645 E3	3675 F9	3716 D2	3744 A4	4517 D6	4541 C6	4565 E4	4589 D3	4613 F4	7515 F4	7712 B3
2511 C6	2547 E4	2614 F7	2663 F9	2736 B2	2784 C2	2874 E6	3535 E4	3561 C3	3589 D5	3618 F7	3646 F3	3676 F9	3717 E2	3748 C2	4518 D7	4542 D6	4566 D1	4590 B2	4614 E4	7521 E4	7713 A4
2512 D7	2548 E4	2615 F7	2668 D9	2737 D1	2785 D1	2875 D8	3536 D4	3562 C3	3590 C5	3619 E7	3647 F3	3677 E9	3718 E2	3751 C4	4519 E2	4543 D6	4567 E4	4591 C5	4615 F6	7522 E4	7714 B4
2515 D6	2551 A5	2616 F7	2669 D9	2738 D1	2786 D1	2877 B3	3537 E4	3563 E5	3591 D5	3620 F7	3648 F3	3678 E8	3719 D2	3753 C3	4520 E2	4544 D8	4568 F3	4592 E2	4616 B5	7523 D5	7715 C1
2516 D7	2553 A5	2617 E7	2670 D7	2739 D1	2787 D1	3511 E6	3538 D4	3564 C7	3592 C5	3621 E7	3649 B5	3679 E9	3720 D2	3754 B1	4521 B9	4545 D7	4569 F3	4593 E2	4617 B5	7524 C5	7716 C2
2517 D6	2577 D7	2618 F7	2671 D6	2740 D1	2788 D1	3512 E6	3540 C6	3565 D6	3594 F4	3622 F7	3650 B5	3680 E8	3721 D2	3755 B3	4522 B8	4546 E9	4570 F3	4594 B3	4618 B1	7526 B5	7717 C3
2519 D6	2578 D7	2623 D6	2672 E6	2741 C1	2789 C2	3515 D8	3541 E4	3566 E6	3595 F8	3623 F7	3651 B5	3682 E9	3722 D2	3756 C3	4523 D2	4547 E8	4571 F3	4595 B4	4619 B1	7527 B5	
2520 D7	2579 E7	2624 D7	2673 D6	2746 C1	2791 A4	3516 D8	3542 D4	3569 C4	3596 F8	3624 F7	3652 B5	3683 D9	3723 D2	3757 B3	4524 B9	4548 E8	4572 F2	4596 C3	4620 E8	7528 F8	
2523 D6	2580 E7	2625 E4	2674 E6	2747 C1	2792 B2	3517 B3	3543 E4	3570 D4	3597 E8	3625 E6	3653 E2	3684 D9	3724 D2	3758 C3	4525 D9	4549 D2	4573 F2	4597 C3	4621 D4	7529 C6	
2524 D7	2581 D8	2626 D4	2677 D7	2753 C2	2793 B1	3518 B3	3544 D4	3571 D5	3598 F8	3626 F6	3656 B8	3686 E5	3725 D2	3759 B4	4526 D2	4550 E7	4574 F2	4598 B3	4622 E6	7531 F7	
2525 D9	2595 D5	2633 E3	2678 F9	2754 B1	2794 B1	3519 A4	3545 B2	3572 C5	3601 F8	3627 F6	3657 B8	3687 E6	3726 D1	3760 C4	4527 C7	4551 F6	4575 E3	4599 D3	4623 E6	7532 F8	
2526 E9	2596 C5	2634 F3	2681 B6	2755 B1	2795 B1	3520 A4	3546 B2	3573 D5	3602 E7	3628 F6	3658 B8	3688 B3	3727 D1	3761 B3	4528 D7	4552 E6	4576 E4	4600 D3	4624 C7	7533 E7	
2527 D9	2597 D5	2635 F3	2682 B8	2759 C2	2796 B2	3521 C7	3547 A2	3574 C5	3603 F7	3629 E6	3659 B8	3689 B3	3728 D1	3762 C3	4529 D7	4553 E6	4577 D3	4601 B5	4625 C9	7534 F7	
2528 E9	2598 C5	2636 F3	2715 D2	2760 C9	2797 B3	3522 D7	3548 A2	3575 E6	3604 F7	3631 E3	3660 B8	3690 E4	3729 D1	3763 E3	4530 B8	4554 D2	4578 D4	4602 A1	4626 B1	7535 E3	
2529 E9	2601 F8	2637 E4	2716 D2	2761 B1	2798 C3	3523 D9	3549 B3	3577 E8	3605 E7	3633 F4	3662 F3	3691 F4	3732 C2	3764 D2	4531 B6	4555 E6	4579 B7	4603 A2	4627 E1	7536 F2	
2530 B2	2602 E8	2638 F4	2719 D2	2763 C1	2800 D2	3524 E9	3550 C6	3578 E7	3606 F7	3634 F4	3663 F3	3692 C7	3733 C2	3765 C9	4532 B6	4556 E6	4580 B1	4604 B1	4628 D1	7537 B8	
2531 E7	2603 F7	2639 F4	2720 D1	2764 A4	2865 B9	3525 D9	3551 A5	3580 E8	3609 E7	3635 E3	3665 B6	3693 C8	3734 C2	3774 B1	4533 D8	4557 E6	4581 E3	4605 D2	4629 B3	7538 B8	
2535 D4	2604 F8	2649 E3	2721 D1	2768 D2	2866 B9	3526 E9	3552 A4	3581 E6	3610 F8	3636 F3	3666 B7	3694 C8	3735 C1	3775 C2	4534 B6	4558 E8	4582 E4	4606 B3	4630 B6	7539 B8	
2536 D4	2605 E7	2650 F2	2722 D1	2775 B3	2867 B9	3527 E9	3553 A5	3582 E6	3611 F8	3637 E3	3667 D6	3696 B6	3736 D1	4511 D6	4535 D9	4559 F8	4583 E4	4607 B4	5512 E3	7541 F9	
2537 D4	2606 F7	2651 B5	2723 D1	2776 C3	2868 E8	3528 F9	3554 B5	3583 D6	3612 F7	3638 F3	3668 D7	3711 E3	3738 C1	4512 C7	4536 E9	4560 D8	4584 A2	4608 B2	5513 A2	7542 E9	
2538 D4	2607 E7	2652 B5	2724 D1	2777 B4	2869 D5	3529 E4	3555 B5	3584 E6	3613 F7	3639 E4	3671 F8	3712 D2	3740 B4	4513 E8	4537 E7	4561 F8	4585 D4	4609 B4	5713 D2	7543 E9	
2539 D3	2608 F7	2656 B7	2725 D1	2778 C4	2870 E6	3530 E4	3556 B5	3585 D5	3614 F7	3640 F4	3672 F8	3713 E2	3741 A4	4514 E9	4538 C6	4562 D7	4586 D4	4610 B6	7511 D7	7551 B7	
2543 F9	2611 F7	2657 B7	2726 D1	2781 A5	2871 D6	3531 E4	3557 A5	3586 C5	3615 F7	3642 F3	3673 F8	3714 D2	3742 B4	4515 E1	4539 F9	4563 F5	4587 D4	4611 A2	7512 D4	7553 C8	
2544 F9	2612 F7	2658 E1	2733 D1	2782 C1	2872 E6	3532 D4	3559 E8	3587 D5	3616 F7	3643 F3	3674 F9	3715 D2	3743 A4	4516 F3	4540 D5	4564 F4	4588 D4	4612 B3	7513 D5	7711 C1	

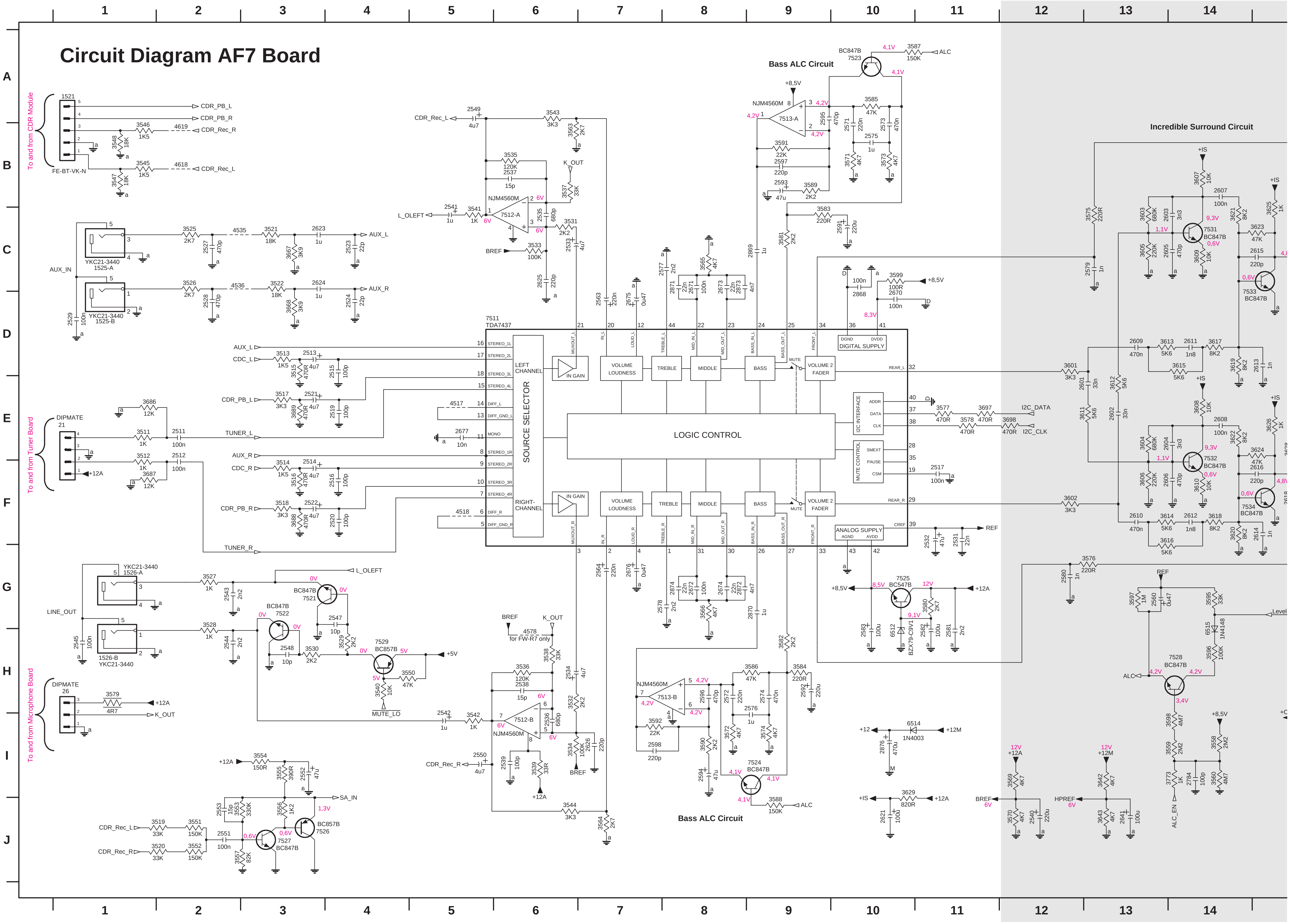
AF7 Board copperside view

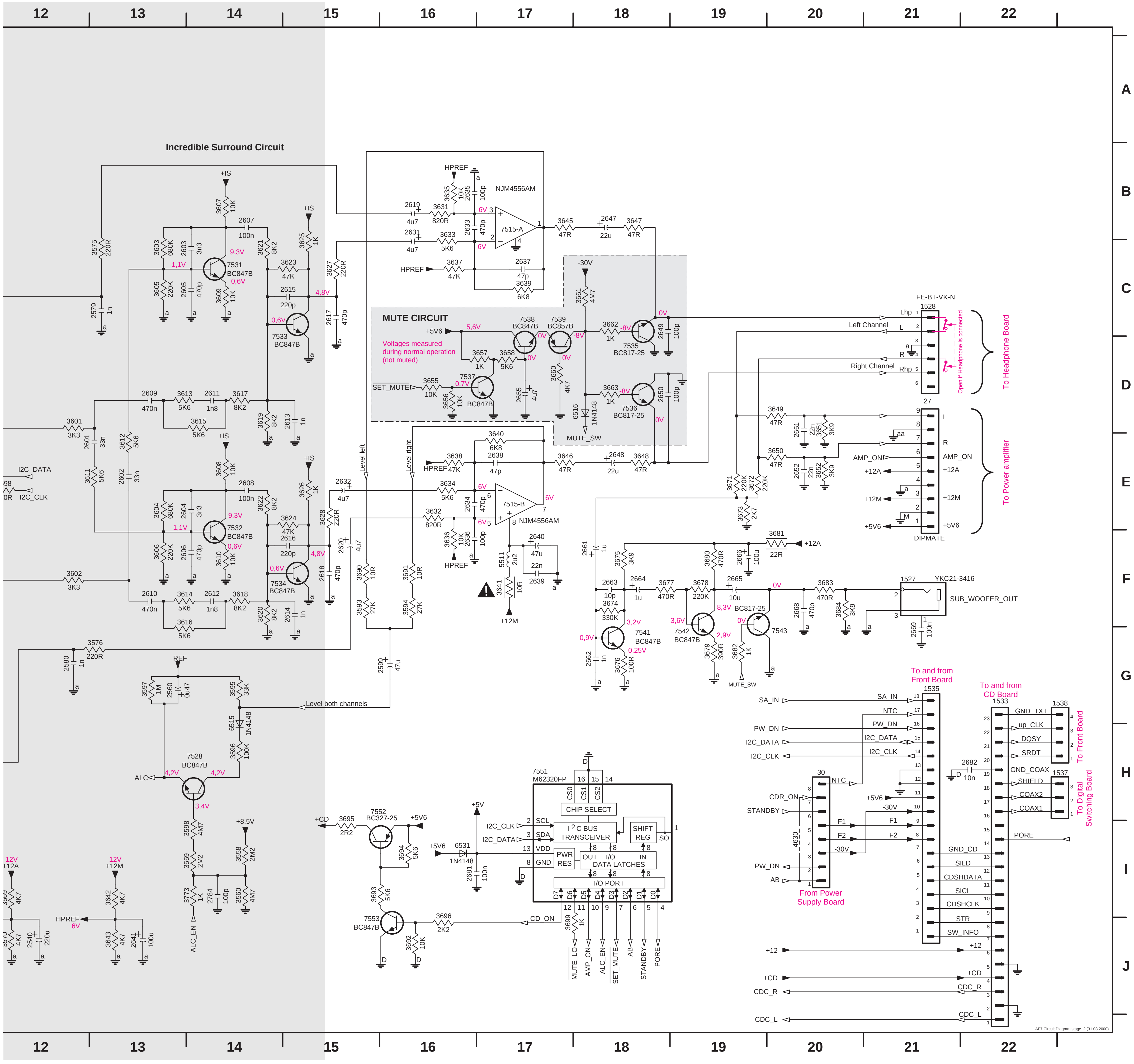


This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

AF7 Board Layout stage .1 1999 12 21

Circuit Diagram AF7 Board


Bass ALC Circuit
Incredible Surround Circuit
To and from CDR Module
1521
FE-BT-VK-N
CDR_PB_L
CDR_PB_R
CDR_Rec_R
CDR_Rec_L
AUX_IN
YKC21-3440 1525-A
YKC21-3440 1525-B
AUX_L
AUX_R
To and from Tuner Board
DIPMATE 21
TUNER_L
TUNER_R
+12A
LINE_OUT
YKC21-3440 1526-A
1526-B YKC21-3440
L_OLEFT
To and from Microphone Board
DIPMATE 26
K_OUT
MUTE_LO
SA_IN
+5V
BC847B 7521
BC847B 7522
BC857B 7529
BC847B 7527
BC857B 7526
NJM4560M 7512-A
NJM4560M 7512-B
BREF
4578 for FW-R7 only
7511 TDA7437
SOURCE SELECTOR
LEFT CHANNEL
RIGHT-CHANNEL
IN GAIN
VOLUME LOUDNESS
TREBLE
MIDDLE
BASS
MUTE
VOLUME 2 FADER
DIGITAL SUPPLY
ANALOG SUPPLY
LOGIC CONTROL
I2C INTERFACE
MUTE CONTROL
I2C_DATA
I2C_CLK
REF
NJM4560M 7513-A
NJM4560M 7513-B
BC847B 7523
BC847B 7524
ALC
+8,5V
BC547B 7525
BZX79-C9V1
1N4003
+12M
+IS
BC847B 7531
BC847B 7532
BC847B 7533
BC847B 7534
BC847B 7528
1N4148
Level
ALC_EN
HPREF
+12
1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
J


12
13
14
15
16
17
18
19
20
21
22
A
B
C
D
E
F
G
H
I
J
Incredible Surround Circuit
MUTE CIRCUIT
Voltages measured during normal operation (not muted)
SET_MUTE
MUTE_SW
NJM4556AM
7515-A
7515-B
HPREF
+IS
7531 BC847B
7532 BC847B
7533 BC847B
7534 BC847B
7535 BC817-25
7536 BC817-25
7537 BC847B
7538 BC847B
7539 BC857B
7541 BC847B
7542 BC847B
7543 BC817-25
7528 BC847B
7552 BC327-25
7553 BC847B
7551 M62320FP
CHIP SELECT
I²C BUS TRANSCEIVER
SHIFT REG
PWR RES
OUT I/O IN DATA LATCHES
I/O PORT
SCL
SDA
VDD
GND
SO
I2C_DATA
I2C_CLK
Level left
Level right
Level both channels
REF
ALC
ALC_EN
+CD
CD_ON
+5V
+5V6
+12A
+12M
+8,5V
-30V
-8V
0V
6V
5,6V
0,7V
4,8V
0,6V
1,1V
9,3V
4,2V
3,4V
3,2V
0,9V
0,25V
3,6V
8,3V
2,9V
1N4148
FE-BT-VK-N
1528
Lhp
Left Channel
L
R
Right Channel
Rhp
Open if Headphone is connected
To Headphone Board
DIPMATE
AMP_ON
+5V6
To Power amplifier
1527
YKC21-3416
SUB_WOOFER_OUT
To and from Front Board
1535
SA_IN
PW_DN
NTC
CDR_ON
STANDBY
AB
From Power Supply Board
To and from CD Board
1533
1538
1537
GND_TXT
up_CLK
DQSY
SRDT
GND_COAX
SHIELD
COAX2
COAX1
To Front Board
To Digital Switching Board
PORE
GND_CD
SILD
CDSHDATA
SICL
CDSHCLK
STR
SW_INFO
+12
CDC_R
CDC_L
F1
F2
MUTE_LO
AMP_ON
ALC_EN
SET_MUTE
AB
STANDBY
PORE
AF7 Circuit Diagram stage 2 (31 03 2000)

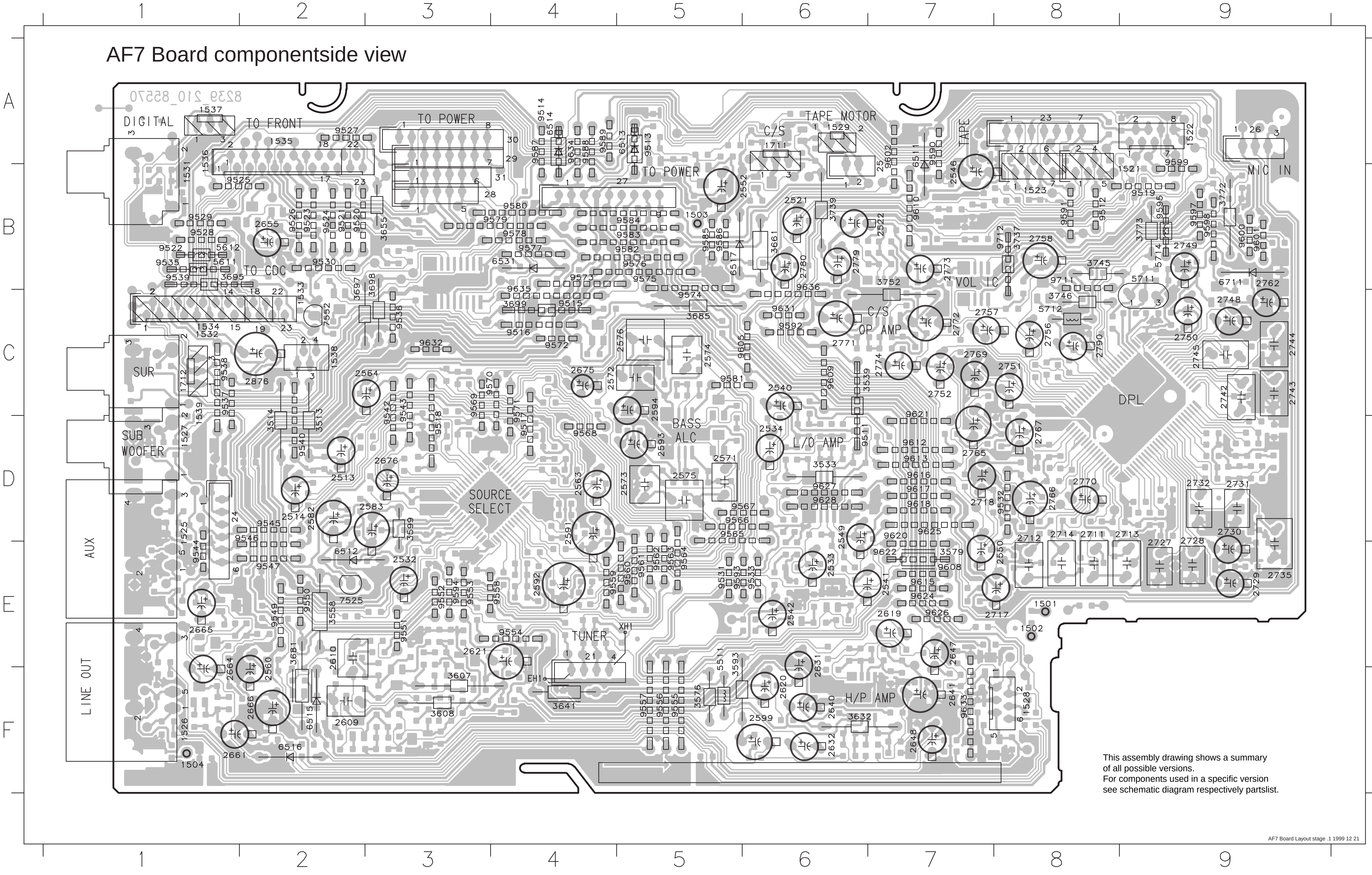
0021	E1	2617	C15	3552	J2	3651	E20
0026	H1	2618	F15	3553	J3	3652	E20
0027	D21	2619	B16	3554	I3	3655	D16
0030	H20	2620	F15	3555	I3	3656	D16
1521	A1	2621	J10	3556	J3	3657	D17
1525	C1	2623	C3	3557	J3	3658	D17
1526	H1	2624	C3	3558	I14	3660	D17
1527	F21	2625	C6	3559	I14	3661	C18
1528	C21	2626	I7	3560	I14	3662	D18
1533	G22	2631	C16	3563	B6	3663	D18
1535	G21	2632	E15	3564	J7	3667	C3
1537	H22	2633	C16	3565	C8	3668	C3
1538	G22	2634	E16	3566	G8	3671	E19
2216	F15	2635	B16	3569	I12	3672	E19
2355	D17	2636	F16	3570	J12	3673	E19
2511	E2	2637	C17	3571	B10	3674	F18
2512	E2	2638	E17	3572	I8	3675	F18
2513	D3	2639	F17	3573	B10	3676	G18
2514	F3	2640	F17	3574	I9	3677	F18
2515	D4	2641	J13	3575	C13	3678	F19
2516	F4	2647	B18	3576	G13	3679	G19
2517	F11	2648	E18	3577	E11	3680	F19
2519	E4	2649	D18	3578	E11	3681	F20
2520	F4	2650	D18	3579	H1	3682	G19
2521	E3	2651	E20	3580	G11	3683	F20
2522	F3	2652	E20	3581	C9	3684	F20
2523	C4	2661	F18	3582	H9	3686	E1
2524	C4	2662	G18	3583	C9	3687	F1
2527	C2	2663	F18	3584	H9	3688	F3
2528	D2	2664	F18	3585	A10	3689	E3
2531	G11	2665	F19	3586	H9	3690	F15
2532	G11	2666	F19	3587	A10	3691	F16
2533	C6	2668	F20	3588	J9	3692	J16
2534	H6	2669	G21	3589	B9	3693	I15
2535	C6	2670	D10	3590	I8	3694	I16
2536	I6	2671	C8	3591	B9	3695	I15
2537	B6	2672	G8	3592	I7	3696	J16
2539	I6	2673	C8	3593	F15	3697	E11
2540	J12	2674	G8	3594	F16	3698	E12
2541	C5	2675	D7	3595	G14	3699	J17
2542	I5	2676	G7	3596	H14	3773	I14
2543	G2	2677	E5	3597	G13	3929	J10
2544	H2	2681	I16	3598	I14	4517	E5
2545	H1	2682	H22	3599	C10	4518	F5
2547	G4	2784	I14	3601	D12	4535	C2
2548	H3	2868	C10	3602	F12	4536	C2
2549	A5	2869	C9	3603	C13	4578	H6
2550	I5	2870	G9	3604	E13	4618	B2
2551	J2	2871	C8	3605	C13	4619	B2
2552	I3	2872	G8	3606	F13	4630	I20
2553	J2	2873	C8	3607	B14	5511	F17
2560	G13	2874	G8	3608	E14	5734	F15
2563	D7	2876	I10	3609	C14	6512	H10
2564	G7	3511	E1	3610	F14	6514	I10
2571	B10	3512	E1	3611	E13	6515	H14
2572	H8	3513	D3	3612	E13	6516	D18
2573	B10	3514	F3	3613	D13	6531	I16
2574	H9	3515	D3	3614	F13	7511	D6
2575	B10	3516	F3	3615	D14	7512-AC6	
2576	H9	3517	E3	3616	G13	7512-BI6	
2577	C8	3518	F3	3617	D14	7513-AA9	
2578	G8	3519	J1	3618	F14	7513-BH8	
2579	C13	3520	J1	3619	D14	7515-AB17	
2580	G12	3521	C3	3620	F14	7515-BE17	
2581	H11	3522	C3	3621	C14	7521	G3
2582	H11	3525	C2	3622	E14	7522	H3
2583	H10	3526	C2	3623	C15	7523	A10
2591	C10	3527	G2	3624	E15	7524	I9
2592	H9	3528	H2	3625	C15	7525	G10
2593	B9	3529	H4	3626	E15	7526	J3
2594	I8	3530	H3	3627	C15	7527	J3
2595	A9	3531	C6	3628	E15	7528	H14
2596	H8	3532	H6	3631	B16	7529	H4
2597	B9	3533	C6	3632	E16	7531	C14
2598	I7	3534	I6	3633	C16	7532	F14
2599	G16	3535	B6	3634	E16	7533	D15
2601	E13	3536	H6	3635	B16	7535	D18
2602	E13	3537	B6	3636	F16	7536	D18
2603	C14	3538	H6	3637	C16	7537	D17
2604	E14	3539	I6	3638	E16	7538	D17
2605	C14	3540	H4	3639	C17	7539	D17
2606	F14	3541	C5	3640	E17	7541	G18
2607	B14	3542	I5	3641	F17	7542	F19
2608	E14	3543	A6	3642	I13	7543	F19
2609	D13	3544	J6	3643	J13	7551	H17
2610	F13	3545	B1	3645	B17	7552	I15
2611	D14	3546	B1	3646	E17	7553	J16
2612	F14	3547	B1	3647	B18		
2613	D15	3548	B1	3648	E18		
2614	F15	3550	H4	3649	D20		
2615	C15	3551	J2	3650	E20		

21	E4	1504	F1	1535	A2	2534	D6	2573	D5	2619	E7	2666	F2	2731	D9
23	A8	1521	B8	1536	A2	2540	C6	2574	C5	2620	F6	2675	C4	2732	D9
24	D1	1522	A9	1537	A1	2541	E7	2575	D5	2621	E4	2676	D3	2735	E9
25	A6	1523	B8	1538	C2	2542	E6	2576	C5	2631	E6	2711	E8	2742	C9
26	A9	1525	E1	1539	C1	2546	A7	2582	D2	2632	F6	2712	E8	2743	C9
27	B4	1526	F1	1711	A6	2549	D7	2583	D3	2640	F6	2713	E9	2744	C9
28	B3	1527	D1	1712	C1	2550	E8	2591	D5	2641	F7	2714	E8	2745	C9
29	A3	1528	F8	2513	D2	2552	B6	2592	E4	2647	E7	2717	E8	2748	C9
30	A3	1529	A6	2514	D2	2560	F2	2593	D5	2648	F7	2718	D8	2749	B9
31	A3	1531	B1	2521	B6	2563	D4	2594	C5	2655	B2	2727	E9	2750	C9
1501	E8	1532	C1	2522	B6	2564	C3	2599	F6	2661	F1	2728	E9	2751	C8
1502	E8	1533	C1	2532	E3	2571	D5	2609	F2	2664	E1	2729	E9	2752	C7
1503	B5	1534	C1	2533	E6	2572	C5	2610	E3	2665	E1	2730	D9	2756	C8

2757	C7	2780	B6	3608	F3	3745	B8	6513	A5	9515	C4	9528	B1
2758	B8	2790	C8	3632	F6	3746	C8	6514	A4	9516	C4	9529	B1
2762	B9	2876	C2	3641	F4	3752	C7	6515	F2	9517	D4	9530	B2
2765	D8	3513	D2	3655	B3	3772	B9	6516	F2	9518	D3	9531	E5
2766	D8	3514	D2	3661	B6	3773	B9	6517	B5	9519	B9	9532	D8
2767	D8	3533	D6	3681	F2	5511	F5	6531	B4	9520	B2	9533	E6
2769	C7	3539	C6	3685	C5	5611	B1	6711	B9	9521	B2	9535	B1
2770	D8	3558	E2	3695	B1	5612	B1	7525	E2	9522	B1	9536	C3
2771	C6	3576	F5	3697	C2	5711	B9	7552	C2	9523	B2	9537	C1
2772	C7	3579	E7	3698	C3	5712	C8	9511	C6	9524	B2	9538	C1
2773	B7	3593	F5	3699	C4	5714	B9	9512	B8	9525	B1	9539	B1
2774	C7	3599	D3	3737	B8	6511	B7	9513	A5	9526	B2	9540	D2
2779	B6	3607	F3	3739	B6	6512	E2	9514	A4	9527	A2	9542	C3

9543	C3	9557	F5	9570	C4	9583	B5	9597	B9	9616	D7	9633	F7
9544	E1	9558	E4	9571	C4	9584	B5	9598	B9	9617	D7	9634	A4
9545	D2	9559	E4	9572	C4	9585	B5	9599	B9	9618	D7	9635	C4
9546	D2	9560	E5	9573	B4	9586	B5	9600	B9	9620	E7	9636	C6
9547	E2	9561	E5	9574	C5	9587	A4	9601	B9	9621	D7	9711	C8
9549	E2	9562	E5	9575	B5	9588	A4	9602	A7	9622	E7	9712	B8
9550	E2	9563	E5	9576	B5	9589	A4	9605	C6	9624	E7		
9551	E3	9564	E5	9577	B4	9590	A7	9608	E7	9625	D7		
9552	E3	9565	D5	9578	B4	9591	B8	9609	C6	9626	E7		
9553	E3	9566	D5	9579	B4	9592	C6	9610	B7	9627	D6		
9554	E4	9567	D6	9580	B4	9593	E5	9612	D7	9628	D6		
9555	F5	9568	D4	9581	C5	9594	E3	9613	D7	9631	C6		
9556	F5	9569	C3	9582	B5	9595	B9	9615	E7	9632	C3		

AF7 Board componentside view



This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

AF7 Board Layout stage .1 1999 12 21

ELECTRICAL PARTSLIST AF7 BOARD

MISCELLANEOUS

1521	4822 267 10954	FFC SOCKET, 5P
1525	4822 267 20452	CINCH SOCKET 2P
1526	4822 267 20452	CINCH SOCKET 2P
1527	4822 267 31729	CINCH SOCKET, 1P
1528	4822 267 10731	FFC SOCKET, 6P
1533	4822 267 10757	FFC SOCKET, 23P, TOP ENTRY
1535	4822 265 11553	FFC SOCKET, 19P
1538	4822 267 10733	FFC SOCKET, 4P
1542	4822 267 10731	FFC SOCKET, 6P
1543	4822 265 11529	HEADPHONE SOCKET

CAPACITORS

2501 ©	4822 126 13838	100nF	10%	50V
2511 ©	4822 126 13838	100nF	10%	50V
2512 ©	4822 126 13838	100nF	10%	50V
2513	4822 124 40769	4,7µF	20%	100V
2514	4822 124 40769	4,7µF	20%	100V
2515 ©	5322 122 32531	100pF	5%	50V
2516 ©	5322 122 32531	100pF	5%	50V
2517 ©	4822 126 14585	100nF	10%	50V
2519 ©	5322 122 32531	100pF	5%	50V
2520 ©	5322 122 32531	100pF	5%	50V
2521	4822 124 40769	4,7µF	20%	100V
2522	4822 124 40769	4,7µF	20%	100V
2523 ©	5322 122 32658	22pF	5%	50V
2524 ©	5322 122 32658	22pF	5%	50V
2527 ©	5322 122 34099	470pF	10%	63V
2528 ©	5322 122 34099	470pF	10%	63V
2529 ©	4822 126 13838	100nF	10%	50V
2531 ©	5322 122 32654	22nF	10%	63V
2532	4822 124 40433	47µF	20%	25V
2533	4822 124 40769	4,7µF	20%	100V
2534	4822 124 40769	4,7µF	20%	100V
2535 ©	4822 122 32535	680pF		
2536 ©	4822 122 32535	680pF		
2537 ©	4822 126 13486	15pF	2%	63V
2538 ©	4822 126 13486	15pF	2%	63V
2539 ©	5322 122 32531	100pF	5%	50V
2540	4822 124 12245	220µF	20%	16V
2541	4822 124 21913	1µF	20%	63V
2542	4822 124 21913	1µF	20%	63V
2543 ©	4822 122 33127	2,2nF	10%	63V
2544 ©	4822 122 33127	2,2nF	10%	63V
2545 ©	4822 126 13838	100nF	10%	50V
2547 ©	5322 122 32448	10pF	5%	50V
2548 ©	5322 122 32448	10pF	5%	50V
2549	4822 124 40769	4,7µF	20%	100V
2550	4822 124 40769	4,7µF	20%	100V
2551 ©	4822 126 14585	100nF	10%	50V
2552	4822 124 41751	47µF	20%	16V
2553 ©	4822 126 13486	15pF	2%	63V
2560	5322 124 41948	0,47µF	20%	50V
2563	4822 124 40746	0,22µF	20%	63V
2564	4822 124 40746	0,22µF	20%	63V
2571	4822 121 42408	220nF	5%	63V
2572	4822 121 42408	220nF	5%	63V
2573	4822 121 51252	470nF	5%	63V
2574	4822 121 51252	470nF	5%	63V
2575	4822 121 51319	1µF	20%	50V
2576	4822 121 51319	1µF	20%	50V
2577 ©	4822 122 33127	2,2nF	10%	63V
2578 ©	4822 122 33127	2,2nF	10%	63V

CAPACITORS

2579 ©	5322 122 31647	1nF	10%	63V
2580 ©	5322 122 31647	1nF	10%	63V
2581 ©	4822 122 33127	2,2nF	10%	63V
2582	4822 124 40207	100µF	20%	25V
2583	4822 124 40207	100µF	20%	25V
2591	4822 124 80144	220µF	20%	25V
2592	4822 124 80144	220µF	20%	25V
2593	4822 124 40433	47µF	20%	25V
2594	4822 124 40433	47µF	20%	25V
2595 ©	5322 122 34099	470pF	10%	63V
2596 ©	5322 122 34099	470pF	10%	63V
2597 ©	4822 122 33575	220pF	5%	50V
2598 ©	4822 122 33575	220pF	5%	50V
2599	4822 124 41751	47µF	20%	16V
2601 ©	4822 126 12105	33nF	5%	63V
2602 ©	4822 126 12105	33nF	5%	63V
2603 ©	4822 122 33891	3,3nF	10%	63V
2604 ©	4822 122 33891	3,3nF	10%	63V
2605 ©	5322 122 34099	470pF	10%	63V
2606 ©	5322 122 34099	470pF	10%	63V
2607 ©	4822 126 14585	100nF	10%	50V
2608 ©	4822 126 14585	100nF	10%	50V
2609	4822 121 51252	470nF	5%	63V
2610	4822 121 51252	470nF	5%	63V
2611 ©	4822 126 10847	1,8nF	10%	50V
2612 ©	4822 126 10847	1,8nF	10%	50V
2613 ©	5322 122 31647	1nF	10%	63V
2614 ©	5322 122 31647	1nF	10%	63V
2615 ©	4822 122 33575	220pF	5%	50V
2616 ©	4822 122 33575	220pF	5%	50V
2617 ©	5322 122 34099	470pF	10%	63V
2618 ©	5322 122 34099	470pF	10%	63V
2619	4822 124 40769	4,7µF	20%	100V
2620	4822 124 40769	4,7µF	20%	100V
2621	4822 124 40207	100µF	20%	25V
2623 ©	4822 126 14043	1µF	20%	16V
2624 ©	4822 126 14043	1µF	20%	16V
2625 ©	4822 122 33575	220pF	5%	50V
2626 ©	4822 122 33575	220pF	5%	50V
2631	4822 124 40769	4,7µF	20%	100V
2632	4822 124 40769	4,7µF	20%	100V
2633 ©	5322 122 34099	470pF	10%	63V
2634 ©	5322 122 34099	470pF	10%	63V
2635 ©	5322 122 32531	100pF	5%	50V
2636 ©	5322 122 32531	100pF	5%	50V
2637 ©	4822 126 13692	47pF	1%	63V
2638 ©	4822 126 13692	47pF	1%	63V
2639 ©	5322 122 32654	22nF	10%	63V
2640	4822 124 40433	47µF	20%	25V
2641	4822 124 40207	100µF	20%	25V
2647	4822 124 81151	22µF	20%	50V
2648	4822 124 81151	22µF	20%	50V
2649 ©	5322 122 32531	100pF	5%	50V
2650 ©	5322 122 32531	100pF	5%	50V
2651 ©	5322 122 32654	22nF	10%	63V
2652 ©	5322 122 32654	22nF	10%	63V
2655	4822 124 40769	4,7µF	20%	100V
2661	4822 124 21913	1µF	20%	63V
2662 ©	5322 122 31647	1nF	10%	63V
2663 ©	5322 122 32448	10pF	5%	50V

ELECTRICAL PARTSLIST AF7 BOARD

CAPACITORS

2664	4822 124 21913	1µF	20%	63V
2665	4822 124 40248	10µF	20%	63V
2666	4822 124 40207	100µF	20%	25V
2668 ©	5322 122 34099	470pF	10%	63V
2669 ©	4822 126 13838	100nF	10%	50V
2670 ©	4822 126 13838	100nF	10%	50V
2671 ©	4822 126 13838	100nF	10%	50V
2672 ©	4822 126 13838	100nF	10%	50V
2673 ©	5322 122 32654	22nF	10%	63V
2674 ©	5322 122 32654	22nF	10%	63V
2675	5322 124 41948	0,47µF	20%	50V
2676	5322 124 41948	0,47µF	20%	50V
2677 ©	5322 122 34098	10nF	10%	50V
2681 ©	4822 126 14585	100nF	10%	50V
2682 ©	5322 122 34098	10nF10%50V		
2691 ©	5322 122 32654	22nF	10%	63V
2692 ©	5322 122 32654	22nF	10%	63V
2694 ©	4822 126 13838	100nF	10%	50V
2781 ©	5322 122 32654	22nF	10%	63V
2784 ©	5322 122 32531	100pF	5%	50V
2868 ©	4822 126 14585	100nF	10%	50V
2869 ©	4822 126 14043	1µF	20%	16V
2870 ©	4822 126 14043	1µF	20%	16V
2871 ©	5322 122 32654	22nF	10%	63V
2872 ©	5322 126 10223	4,7nF	10%	63V
2873 ©	5322 126 10223	4,7nF	10%	63V
2874 ©	5322 122 32654	22nF	10%	63V
2876	4822 124 80791	470µF	20%	16V

RESISTORS

3511 ©	4822 051 10102	1kΩ	2%	0,25W
3512 ©	4822 051 10102	1kΩ	2%	0,25W
3513	4822 116 52243	1,5kΩ	5%	0,16W
3514	4822 116 52243	1,5kΩ	5%	0,16W
3515 ©	4822 051 20471	470Ω	5%	0,1W
3516 ©	4822 051 20471	470Ω	5%	0,1W
3517 ©	4822 051 20332	3,3kΩ	5%	0,1W
3518 ©	4822 051 20332	3,3kΩ	5%	0,1W
3519 ©	4822 051 20333	33kΩ	5%	0,1W
3520 ©	4822 051 20333	33kΩ	5%	0,1W
3521 ©	4822 117 10965	18kΩ	2%	0,1W
3522 ©	4822 117 10965	18kΩ	2%	0,1W
3525 ©	4822 117 12955	2,7kΩ	1%	0,1W
3526 ©	4822 117 12955	2,7kΩ	1%	0,1W
3527 ©	4822 051 10102	1kΩ	2%	0,25W
3528 ©	4822 051 10102	1kΩ	2%	0,25W
3529 ©	4822 117 11449	2,2kΩ	1%	0,1W
3530 ©	4822 117 11449	2,2kΩ	1%	0,1W
3531 ©	4822 117 11449	2,2kΩ	1%	0,1W
3532 ©	4822 117 11449	2,2kΩ	1%	0,1W
3533	4822 116 52234	100kΩ	5%	0,5W
3534 ©	4822 117 10837	100kΩ	1%	0,1W
3535 ©	4822 051 20124	120kΩ	5%	0,1W
3536 ©	4822 051 20124	120kΩ	5%	0,1W
3537 ©	4822 051 20333	33kΩ	5%	0,1W
3538 ©	4822 051 20333	33kΩ	5%	0,1W
3539	4822 052 10339	33Ω	5%	NFR
3540 ©	4822 117 10833	10kΩ	1%	0,1W
3541 ©	4822 051 10102	1kΩ	2%	0,25W
3542 ©	4822 051 10102	1kΩ	2%	0,25W

RESISTORS

3543 ©	4822 051 20332	3,3kΩ	5%	0,1W
3544 ©	4822 051 20332	3,3kΩ	5%	0,1W
3545 ©	4822 117 11139	1,5kΩ	1%	0,1W
3546 ©	4822 117 11139	1,5kΩ	1%	0,1W
3547 ©	4822 117 10965	18kΩ	2%	0,1W
3548 ©	4822 117 10965	18kΩ	2%	0,1W
3550 ©	4822 117 10834	47kΩ	1%	0,1W
3551 ©	4822 051 20154	150kΩ	5%	0,1W
3552 ©	4822 051 20154	150kΩ	5%	0,1W
3553 ©	4822 051 20334	330kΩ	5%	0,1W
3554 ©	4822 117 10353	150Ω	5%	0,1W
3555 ©	4822 051 20391	390Ω	5%	0,1W
3556 ©	4822 051 20122	1,2kΩ	5%	0,1W
3557 ©	4822 117 11149	82kΩ	1%	0,1W
3558	4822 053 20225	2,2MΩ	5%	0,25W
3559 ©	4822 051 20225	2,2MΩ	5%	0,1W
3560 ©	4822 051 20475	4,7MΩ	5%	0,1W
3563 ©	4822 117 12955	2,7kΩ	1%	0,1W
3564 ©	4822 117 12955	2,7kΩ	1%	0,1W
3565 ©	4822 051 20472	4,7kΩ	5%	0,1W
3566 ©	4822 051 20472	4,7kΩ	5%	0,1W
3569 ©	4822 051 20472	4,7kΩ	5%	0,1W
3570 ©	4822 051 20472	4,7kΩ	5%	0,1W
3571 ©	4822 051 20472	4,7kΩ	5%	0,1W
3572 ©	4822 051 20472	4,7kΩ	5%	0,1W
3573 ©	4822 051 20472	4,7kΩ	5%	0,1W
3574 ©	4822 051 20472	4,7kΩ	5%	0,1W
3575 ©	4822 117 11503	220Ω	5%	0,1W
3576	4822 116 83872	220Ω	5%	0,5W
3577 ©	4822 051 20471	470Ω	5%	0,1W
3578 ©	4822 051 20471	470Ω	5%	0,1W
3579	4822 052 10478	4,7Ω	5%	NFR
3580 ©	4822 117 12955	2,7kΩ	1%	0,1W
3581 ©	4822 117 11449	2,2kΩ	1%	0,1W
3582 ©	4822 117 11449	2,2kΩ	1%	0,1W
3583 ©	4822 117 11503	220Ω	5%	0,1W
3584 ©	4822 117 11503	220Ω	5%	0,1W
3585 ©	4822 117 10834	47kΩ	1%	0,1W
3586 ©	4822 117 10834	47kΩ	1%	0,1W
3587 ©	4822 051 20154	150kΩ	5%	0,1W
3588 ©	4822 051 20154	150kΩ	5%	0,1W
3589 ©	4822 117 11449	2,2kΩ	1%	0,1W
3590 ©	4822 117 11449	2,2kΩ	1%	0,1W
3591 ©	4822 051 20223	22kΩ	5%	0,1W
3592 ©	4822 051 20223	22kΩ	5%	0,1W
3593	4822 116 52264	27kΩ	5%	0,5W
3594 ©	4822 051 20273	27kΩ	5%	0,1W
3595 ©	4822 051 20333	33kΩ	5%	0,1W
3596 ©	4822 117 10837	100kΩ	1%	0,1W
3597 ©	4822 051 20105	1MΩ	5%	0,1W
3598 ©	4822 051 20475	4,7MΩ	5%	0,1W
3599	4822 116 52175	100Ω	5%	0,5W
3601 ©	4822 051 20332	3,3kΩ	5%	0,1W
3602 ©	4822 051 20332	3,3kΩ	5%	0,1W
3603 ©	4822 051 20684	680kΩ	5%	0,1W
3604 ©	4822 051 20684	680kΩ	5%	0,1W
3605 ©	4822 117 13579	220kΩ	1%	0.1W
3606 ©	4822 117 13579	220kΩ	1%	0.1W
3607	4822 050 21003	10kΩ	2%	0,25W
3608	4822 050 21003	10kΩ	2%	0,25W

ELECTRICAL PARTSLIST AF7 BOARD

RESISTORS

3609©	4822 117 10833	10kΩ	1%	0,1W
3610©	4822 117 10833	10kΩ	1%	0,1W
3611©	4822 051 20562	5,6kΩ	5%	0,1W
3612©	4822 051 20562	5,6kΩ	5%	0,1W
3613©	4822 051 20562	5,6kΩ	5%	0,1W
3614©	4822 051 20562	5,6kΩ	5%	0,1W
3615©	4822 051 20562	5,6kΩ	5%	0,1W
3616©	4822 051 20562	5,6kΩ	5%	0,1W
3617©	4822 051 20822	8,2kΩ	5%	0,1W
3618©	4822 051 20822	8,2kΩ	5%	0,1W
3619©	4822 051 20822	8,2kΩ	5%	0,1W
3620©	4822 051 20822	8,2kΩ	5%	0,1W
3621©	4822 051 20822	8,2kΩ	5%	0,1W
3622©	4822 051 20822	8,2kΩ	5%	0,1W
3623©	4822 117 10834	47kΩ	1%	0,1W
3624©	4822 117 10834	47kΩ	1%	0,1W
3625©	4822 051 10102	1kΩ	2%	0,25W
3626©	4822 051 10102	1kΩ	2%	0,25W
3627©	4822 117 11503	220Ω	5%	0,1W
3628©	4822 117 11503	220Ω	5%	0,1W
3629©	4822 117 11454	820Ω	1%	
3631©	4822 117 11454	820Ω	1%	
3632	4822 116 52231	820Ω	5%	0,5W
3633©	4822 051 20562	5,6kΩ	5%	0,1W
3634©	4822 051 20562	5,6kΩ	5%	0,1W
3635©	4822 117 10833	10kΩ	1%	0,1W
3636©	4822 117 10833	10kΩ	1%	0,1W
3637©	4822 117 10834	47kΩ	1%	0,1W
3638©	4822 117 10834	47kΩ	1%	0,1W
3639©	4822 117 11507	6,8kΩ	1%	0,1W
3640©	4822 117 11507	6,8kΩ	1%	0,1W
3641 ⚠	4822 052 10109	10Ω	5%	NFR
3642©	4822 051 20472	4,7kΩ	5%	0,1W
3643©	4822 051 20472	4,7kΩ	5%	0,1W
3645©	4822 051 20479	47Ω	5%	0,1W
3646©	4822 051 20479	47Ω	5%	0,1W
3647©	4822 051 20479	47Ω	5%	0,1W
3648©	4822 051 20479	47Ω	5%	0,1W
3649©	4822 051 20479	47Ω	5%	0,1W
3650©	4822 051 20479	47Ω	5%	0,1W
3651©	4822 051 20392	3,9kΩ	5%	0,1W
3652©	4822 051 20392	3,9kΩ	5%	0,1W
3655	4822 050 21003	10kΩ	2%	0,25W
3656©	4822 117 10833	10kΩ	1%	0,1W
3657©	4822 051 10102	1kΩ	2%	0,25W
3658©	4822 051 20562	5,6kΩ	5%	0,1W
3660©	4822 051 20472	4,7kΩ	5%	0,1W
3661	4822 053 20475	4,7MΩ	5%	0,25W
3662©	4822 051 10102	1kΩ	2%	0,25W
3663©	4822 051 10102	1kΩ	2%	0,25W
3667©	4822 051 20392	3,9kΩ	5%	0,1W
3668©	4822 051 20392	3,9kΩ	5%	0,1W
3671©	4822 117 13579	220kΩ	1%	0.1W
3672©	4822 117 13579	220kΩ	1%	0.1W
3673©	4822 117 12955	2,7kΩ	1%	0.1W
3674©	4822 051 20334	330kΩ	5%	0,1W
3675©	4822 051 20392	3,9kΩ	5%	0,1W
3676©	4822 051 20101	100Ω	5%	0,1W
3677©	4822 051 20471	470Ω	5%	0,1W
3678©	4822 117 13579	220kΩ	1%	0.1W

RESISTORS

3679©	4822 051 20391	390Ω	5%	0,1W
3680©	4822 051 20471	470Ω	5%	0,1W
3681	4822 052 10229	22Ω	5%	0,33W
3682©	4822 051 10102	1kΩ	2%	0,25W
3683©	4822 051 20471	470Ω	5%	0,1W
3684©	4822 051 20392	3,9kΩ	5%	0,1W
3686©	4822 117 11383	12kΩ	1%	0,1W
3687©	4822 117 11383	12kΩ	1%	0,1W
3688©	4822 051 20471	470Ω	5%	0,1W
3689©	4822 051 20471	470Ω	5%	0,1W
3690©	4822 051 20109	10Ω	5%	0,1W
3691©	4822 051 20109	10Ω	5%	0,1W
3692©	4822 117 10833	10kΩ	1%	0,1W
3693©	4822 051 20562	5,6kΩ	5%	0,1W
3694©	4822 051 20562	5,6kΩ	5%	0,1W
3695	4822 116 81154	2,2Ω	5%	0,5W
3696©	4822 117 11449	2,2kΩ	1%	0,1W
3697	4822 116 83883	470Ω	5%	0,16W
3698	4822 116 83883	470Ω	5%	0,16W
3699	4822 050 11002	1kΩ	5%	0,2W
3773	4822 050 11002	1kΩ	5%	0,2W

4516©	4822 051 20008	CHIP JUMPER 0805
4517©	4822 051 20008	CHIP JUMPER 0805
4518©	4822 051 20008	CHIP JUMPER 0805
4519©	4822 051 20008	CHIP JUMPER 0805
4520©	4822 051 20008	CHIP JUMPER 0805
4521©	4822 051 20008	CHIP JUMPER 0805
4522©	4822 051 20008	CHIP JUMPER 0805
4524©	4822 051 20008	CHIP JUMPER 0805
4525©	4822 051 20008	CHIP JUMPER 0805
4526©	4822 051 20008	CHIP JUMPER 0805
4527©	4822 051 20008	CHIP JUMPER 0805
4528©	4822 051 20008	CHIP JUMPER 0805
4529©	4822 051 20008	CHIP JUMPER 0805
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4532©	4822 051 20008	CHIP JUMPER 0805
4533©	4822 051 20008	CHIP JUMPER 0805
4534©	4822 051 20008	CHIP JUMPER 0805
4535©	4822 051 20008	CHIP JUMPER 0805
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4542©	4822 051 20008	CHIP JUMPER 0805
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4551©	4822 051 20008	CHIP JUMPER 0805
4552©	4822 051 20008	CHIP JUMPER 0805
4553©	4822 051 20008	CHIP JUMPER 0805
4554©	4822 051 20008	CHIP JUMPER 0805
4555©	4822 051 20008	CHIP JUMPER 0805
4556©	4822 051 20008	CHIP JUMPER 0805
4557©	4822 051 20008	CHIP JUMPER 0805

ELECTRICAL PARTSLIST AF7 BOARD

RESISTORS

4558©	4822 051 20008	CHIP JUMPER 0805
4559©	4822 051 20008	CHIP JUMPER 0805
4560©	4822 051 20008	CHIP JUMPER 0805
4561©	4822 051 20008	CHIP JUMPER 0805
4562©	4822 051 20008	CHIP JUMPER 0805
4563©	4822 051 20008	CHIP JUMPER 0805
4564©	4822 051 20008	CHIP JUMPER 0805
4565©	4822 051 20008	CHIP JUMPER 0805
4567©	4822 051 20008	CHIP JUMPER 0805
4568©	4822 051 20008	CHIP JUMPER 0805
4569©	4822 051 20008	CHIP JUMPER 0805
4570©	4822 051 20008	CHIP JUMPER 0805
4571©	4822 051 20008	CHIP JUMPER 0805
4572©	4822 051 20008	CHIP JUMPER 0805
4573©	4822 051 20008	CHIP JUMPER 0805
4574©	4822 051 20008	CHIP JUMPER 0805
4575©	4822 051 20008	CHIP JUMPER 0805
4576©	4822 051 20008	CHIP JUMPER 0805
4577©	4822 051 20008	CHIP JUMPER 0805
4579©	4822 051 20008	CHIP JUMPER 0805
4580©	4822 051 20008	CHIP JUMPER 0805
4581©	4822 051 20008	CHIP JUMPER 0805
4582©	4822 051 20008	CHIP JUMPER 0805
4583©	4822 051 20008	CHIP JUMPER 0805
4585©	4822 051 20008	CHIP JUMPER 0805
4586©	4822 051 20008	CHIP JUMPER 0805
4587©	4822 051 20008	CHIP JUMPER 0805
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4592©	4822 051 20008	CHIP JUMPER 0805
4593©	4822 051 20008	CHIP JUMPER 0805
4595©	4822 051 20008	CHIP JUMPER 0805
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4601©	4822 051 20008	CHIP JUMPER 0805
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4603©	4822 051 20008	CHIP JUMPER 0805
4605©	4822 051 20008	CHIP JUMPER 0805
4606©	4822 051 20008	CHIP JUMPER 0805
4607©	4822 051 20008	CHIP JUMPER 0805
4608©	4822 051 20008	CHIP JUMPER 0805
4609©	4822 051 20008	CHIP JUMPER 0805
4611©	4822 051 20008	CHIP JUMPER 0805
4612©	4822 051 20008	CHIP JUMPER 0805
4613©	4822 051 20008	CHIP JUMPER 0805
4614©	4822 051 20008	CHIP JUMPER 0805
4615©	4822 051 20008	CHIP JUMPER 0805
4618©	4822 051 20008	CHIP JUMPER 0805
4619©	4822 051 20008	CHIP JUMPER 0805
4620©	4822 051 20008	CHIP JUMPER 0805
4621©	4822 051 20008	CHIP JUMPER 0805
4622©	4822 051 20008	CHIP JUMPER 0805
4623©	4822 051 20008	CHIP JUMPER 0805
4624©	4822 051 20008	CHIP JUMPER 0805
4625©	4822 051 20008	CHIP JUMPER 0805
4626©	4822 051 20008	CHIP JUMPER 0805
4627©	4822 051 20008	CHIP JUMPER 0805
4629©	4822 051 20008	CHIP JUMPER 0805

RESISTORS

4630©	4822 051 20008	CHIP JUMPER 0805
4715©	4822 051 20008	CHIP JUMPER 0805
4716©	4822 051 20008	CHIP JUMPER 0805

COILS

5511	4822 157 62552	2,2µH
5523	4822 157 62552	2,2µH
5531	4822 157 62552	2,2µH
5532	4822 157 62552	2,2µH

DIODES

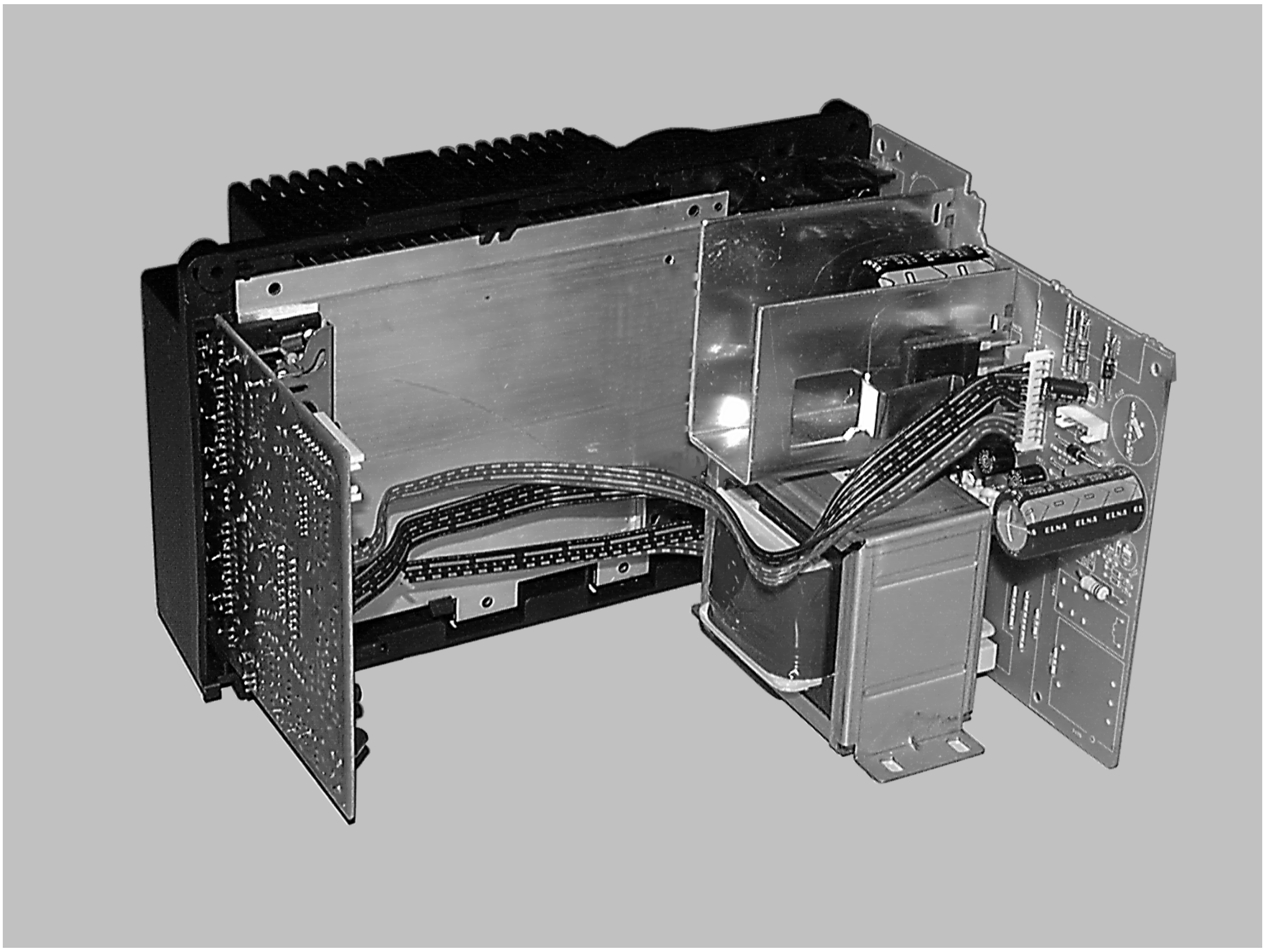
6512	4822 130 30862	BZX79-C9V1
6514	4822 130 31878	1N4003G
6515	4822 130 30621	1N4148
6516	4822 130 30621	1N4148
6531	4822 130 30621	1N4148

TRANSISTORS

7521©	4822 130 60511	BC847B
7522©	4822 130 60511	BC847B
7523©	4822 130 60511	BC847B
7524©	4822 130 60511	BC847B
7525	4822 130 40959	BC547B
7526©	4822 130 60373	BC856B
7527©	4822 130 60511	BC847B
7528©	4822 130 60511	BC847B
7529©	4822 130 60373	BC856B
7531©	4822 130 60511	BC847B
7532©	4822 130 60511	BC847B
7533©	4822 130 60511	BC847B
7534©	4822 130 60511	BC847B
7535©	4822 130 42804	BC817-25
7536©	4822 130 42804	BC817-25
7537©	4822 130 60511	BC847B
7538©	4822 130 60511	BC847B
7539©	4822 130 60373	BC856B
7541©	4822 130 60511	BC847B
7542©	4822 130 60511	BC847B
7543©	4822 130 42804	BC817-25
7552	4822 130 41246	BC327-25
7553©	4822 130 60511	BC847B

INTEGRATED CIRCUITS

7511©	4822 209 17386	TDA7437T, Selector&Sound processor
7512©	4822 209 83357	NJM4560M, 2-FOLD OP-AMP.
7513©	4822 209 83357	NJM4560M, 2-FOLD OP-AMP.
7515©	4822 209 31378	NJM4556M, 2-FOLD OP-AMP.
7551©	4822 209 17345	M62320FP, I2C SHIFT REGISTER



POWER 4-CDR Module

stage .6

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Partslist..9-11

CIRCUIT DESCRIPTION FOR POWER4-MODULE

Supply-part

General *(pos. numbers refer to circuit diagram chapter 9-7)*

The primary circuitry depends on the version:

- Versions with fixed primary voltage: 100VAC for /26
  120VAC for /37
  220-240VAC for /22/25/30/33/34
  Versions /22/25/26/37 use radial type-fuse 1201, versions /30/33/34 use glass tube fuse 1202.
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- Version with switchable primary voltage: 110-127/220-240VAC for /21
  In version /21 voltage selector 1210 is built-in and each primary winding is protected separately (fuses 1201 and 1200).
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- European versions – “*low power standby feature”*
  For detailed description see below.

Circuit details:

- **Low power standby feature**

  An additional small standby transformer, connected in series to the mains transformer, reduces power consumption in standby-mode.
  In case power is switched on, the control line ECO is low → relay 1208 is activated → standby transformer 5211 is shortened and out of work.
  When the set is switched off (standby) the control line ECO is high → relay 1208 is not activated → standby transformer 5211 is now connected in series to the primary winding of the mains transformer 1008. As the impedance of the standby transformer is much higher than the impedance of the mains transformer, the mainsvoltage is divided by approx. 85% (standby transformer) to 15% (mains transformer). Thus the mains transformer delivers very low secondary voltage → power consumption is less than 100mW.
  Via standby transformer and rectifiers 6209-6212 the supply voltage +C is substituted. The 5,6V regulator is still working and so the microprocessor is kept running.

- **DC voltages +A, +B1/+B2, +C**

  These voltages supply the Super Class G amplifier, described later in this chapter.
  The whole power supply is optimized for the special characteristic of this type of amplifier. For that reason several “tricky” details have been applied to ensure optimal efficiency and symmetrical load to the mains transformer.

  Generation of +A

  Common full wave rectifying with bridge rectifier 6201, using 100% secondary winding of mains transformer (pin 9-15).

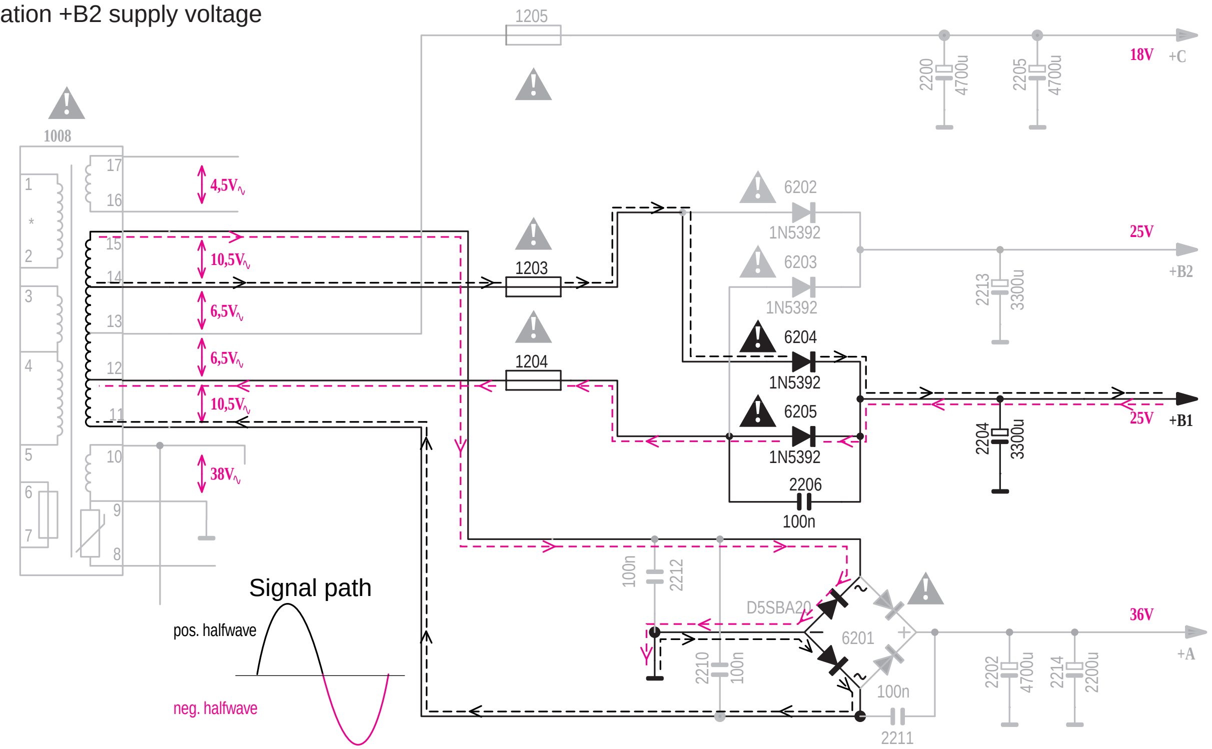
  Generation of +B1/+B2

  The power supply is designed to cover both, 2-channel and 4-channel application.
  While for 2-channel application only one supply voltage +B1 is sufficient, 4-channel application requires an additional supply part +B2 which supplies the Center/Surround-amplifiers and the +12V-regulator (current required by 4 amplifiers would overload a single rectifier).

  The supply for 2-channel versions consists of one full wave rectifier:
  – 2 diodes of bridge rectifier 6201, with 6204/6205 for generation of +B1
  – +B2 is connected in parallel with a bridge wire.

  The supply for 4-channel versions consists of two separate full wave rectifiers:
  – 2 diodes of bridge rectifier 6201, with 6204/6205 (for +B1) and
  – 2 diodes of bridge rectifier 6201, with 6202/6203 (for +B2),
  using approx. 70% secondary winding of mains transformer (pin 9-14 respectively pin 12-15).
  As example for generation of +B2 see picture 1.

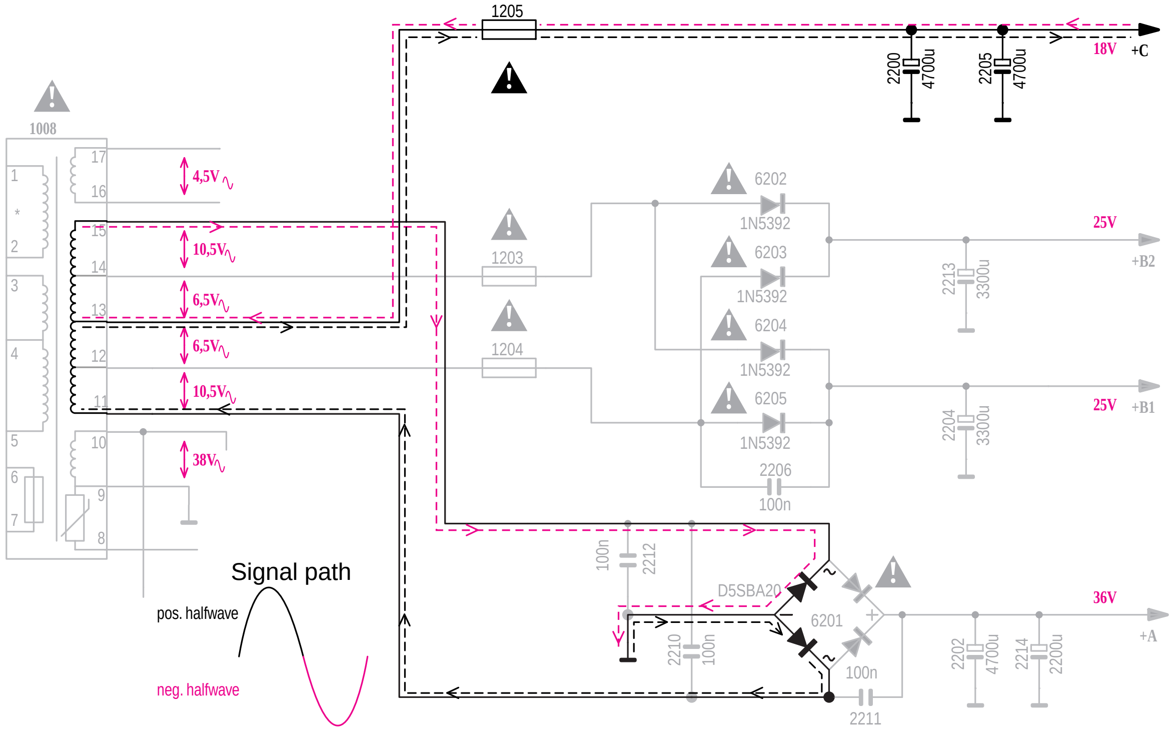
Generation +B2 supply voltage


1205
1008
17
16
15
14
13
12
11
10
9
8
1
2
3
4
5
6
7
4,5V
10,5V
6,5V
6,5V
10,5V
38V
1203
1204
2200 4700u
2205 4700u
18V +C
6202 1N5392
6203 1N5392
6204 1N5392
6205 1N5392
2206 100n
25V +B2
2213 3300u
25V +B1
2204 3300u
100n 2212
D5SBA20
6201
2210 100n
100n 2211
36V +A
2202 4700u
2214 2200u
Signal path
pos. halfwave
neg. halfwave

picture 1

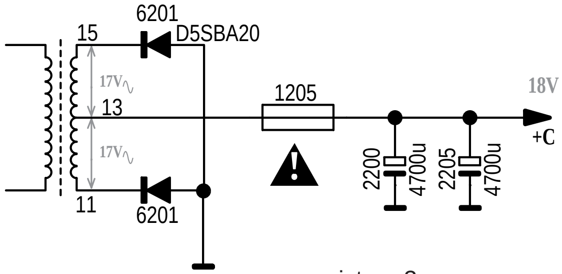
Generation of +C

Full wave rectifying with 2 diodes of bridge rectifier 6201, using 50% secondary winding of mains transformer (pin 13-15/13-11). See pictures 2 and 3 below.


1205
18V +C
2200 4700u
2205 4700u
1008
17
16
15
14
13
12
11
10
9
8
1
2
3
4
5
6
7
4,5V
10,5V
6,5V
6,5V
10,5V
38V
1203
1204
6202 1N5392
6203 1N5392
6204 1N5392
6205 1N5392
2206 100n
25V +B2
2213 3300u
25V +B1
2204 3300u
100n 2212
D5SBA20
6201
2210 100n
100n 2211
36V +A
2202 4700u
2214 2200u
Signal path
pos. halfwave
neg. halfwave

picture 2

Simplified


15
6201
D5SBA20
17V
13
17V
11
6201
1205
18V
+C
2200 4700u
2205 4700u

picture 3

Circuit details (continoued):

- **Supply voltages for FTD** (**F**luorescent **T**ube **D**isplay)
  The FTD requires two supply voltages, delivered by separate windings of the mains transformer:
  – 4,5VAC for FTD heating (transformer pin 16/17)
  – -30V stabilized by the -30V regulator located on the amplifier part. The supply part delivers -35V unstabilized (transformer pin 9/10), typical value: -35V...-45V.

- **Stabilized +5V6**
  Stabilizer 7201 generates the supply voltage +5V6 for the microprocessor. In fault condition the output voltage can rise up to approx. 17V, which would definitely damage the device. Therefore an overvoltage protection for the +5V6 supply is implemented.
  Whenever the output of stabilizer rises above 7,5V, the base of 7202 reaches 0,7V (7,5V - voltage drop on 6207), the transistor switches through and short circuits the input voltage. This causes the safety resistor 3204 to blow out and interrupt immediately.

- **Temperature monitoring**
  The mains transformer is equipped with a NTC, embedded in the secondary winding (pin 8/9). Via the NTC line the temperature of the mains transformer is continuously monitored by the microprocessor. Further actions depend on the software of the set. Usually the set will be switched to standby mode when the transformer is overheated.

- **Power down (PWDN) monitoring**
  In order to enable proper switch off conditions the mains supply is monitored by the microprocessor via the PWDN line.
  In case of mains supply interrupts the PWDN line becomes low, while the +5V6 is still stable. This enables the microprocessor to take actions for a save shut-down (e.g. mute, reset of electronics, release of head support of tape deck).

Amplifier part

+12V-regulator *(pos. numbers refer to circuit diagram chapter 9-9)*

Is used to supply all motors (+12M) and all analogue circuits (+12A) in the set. +12C is provisional only.

- **Power on/off:**
  Switching on/off is done via the STBY-line from the microprocessor. H=ON, L=OFF
  If the STBY line is high - transistor 7222 is conductive. Base of 7224 becomes less positive than the emitter. This causes transistor 7224 to switch trough and supply the base of 7221. Consequently 7221 swiches trough too.
  Via 3218 transistor 3228 is conductive as soon as B2 is available. Consequently switching transistor 7227 is also switched through.

  If the STBY line is switched to low level base current for 7222 is blocked. In turn 7224 and 7221 are blocked. → OFF.

- **Regulation:**
  Key components are power-transistor 7221, reference diode 6221 and transistor 7223.
  After power is switched on via the STBY line as described above the +12A increases until 7223 becomes conductive via reference diode 6221 → 7223 reduces base current of 7221 → +12A is stable (typical +12,4V).
  In normal operating mode 7227 is always switched trough as described above.

- **Protections:**
  In case of overcurrent (typical 2,5A) 7227 gets out of saturation → 7226 becomes conductive → 7225 becomes conductive via 6225 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.
  Restarting is only possible with power OFF→ ON.

  In case of overvoltage (more than +15V on emitter of 7221) 7225 is now activated via 6233 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.

  These protections are implemented for saving the set-electronic in any fault-condition.

-30V-regulator

- Grid supply for the FTD switched by the microprocessor.
  Simple regulation with 6251 as reference. Typical value: -29V. Maximum current: 30mA

Circuit details (continoued):

VCD- Supply:

Is a provision for versions with a Video CD Player.

This circuitry consists of a switched supply with a regulator to 5,1V (±0,15V).

- **Switching on/off** is done via the VCD_ON line from the microprocessor (H=on, L=off). If the VCD_ON line is high - transistor 7236 becomes conductive. This causes transistor 7238 to switch through. +5VCD is available. If the VCD_ON is low - transistor 7236 is blocked → no base current through 7238 → transistor 7238 is blocked too → +5VCD is switched off.

- **Regulation** is done via Z- diode 6244 and transistor 7237.
  If the +5VCD exceeds 5,1V the basis of transistor 7237 becomes higher than 0,6V via Z- diode 6244. Consequently transistor 7237 becomes conductive. This causes a reduced base current through 7236. Transistor 7236 becomes less conductive and reduces the base current trough 7238. Transistor 7238 becomes less conductive too and reduces the +5VCD.

Amplifier:

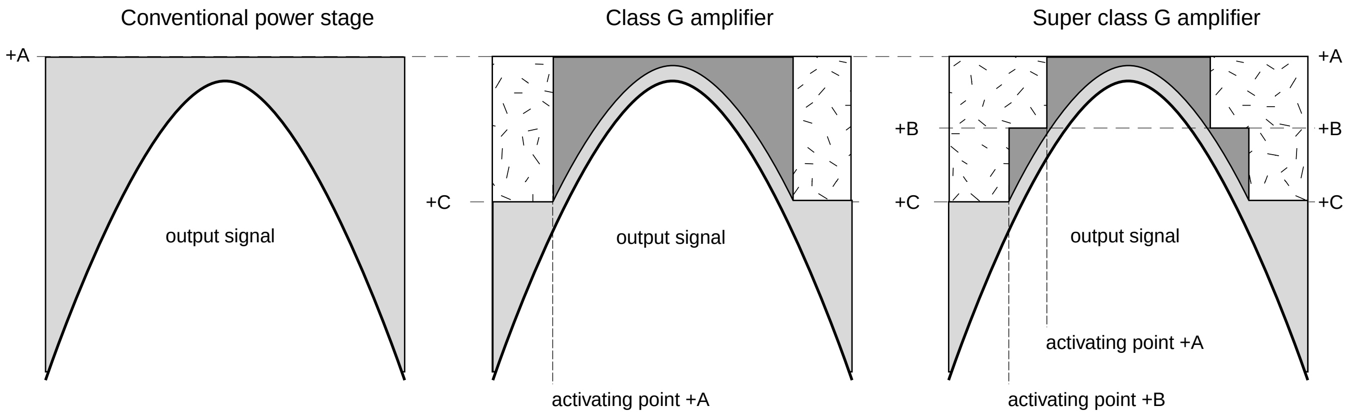
Attention: In the POWER 4 module the power amplifier IC AN7164 is used as a bridge-amplifier.
Any connection from output to ground will destroy the outpout stages!

- Via the AMP_ON control line, connected to pins 6 (Stby), the power amplifiers are switched on/off by the µP.
  High level (approx. 4,5V): power amplifiers switched on
  Low level (approx. 0V): power amplifiers switched off

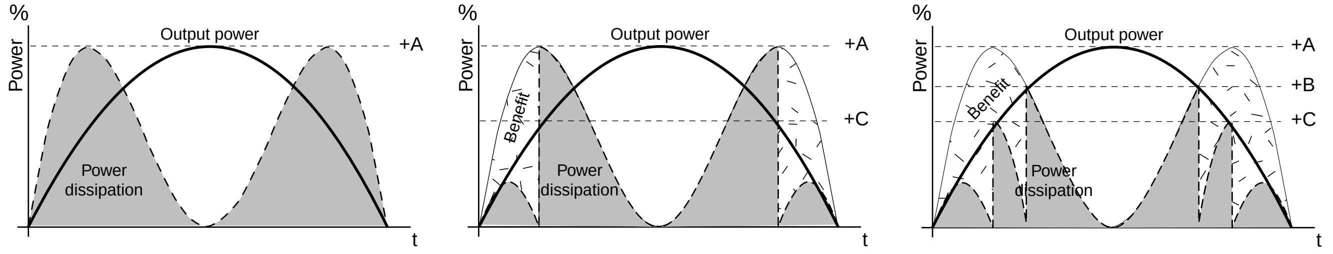
- Super class G - operation

  The power amplifiers operate as so-called super class G - amplifiers:
  The supply pins 12 (Vcc) are not just connected to one fixed DC-supply as in conventional amplifiers.
  Dependent on the output power there are three different DC-voltages supplied to the power amplifiers:
  ⇒ +C (+18V) for low output power
  ⇒ +B (+25V) for medium output power
  ⇒ +A (+36V for high output power

Principle / benefit of Super Class G



▨ Voltage drop on power stage IC
■ Voltage drop on switching transistor(s)
☐ Benefit - voltage drop on switching transistor(s) reduces total power dissipation



- advantages:
  - best efficiency
  - less power drawn from the mains transformer than by conventional operating amplifiers reduces transformer heating.
  - reduced power dissipation at the amplifier ICs results in
    - less junction temperature and better reliability
    - possibility of higher output power with smaller cooling fin
    - smaller size

- Functional description of the super class G - circiuitry used in Power4-module

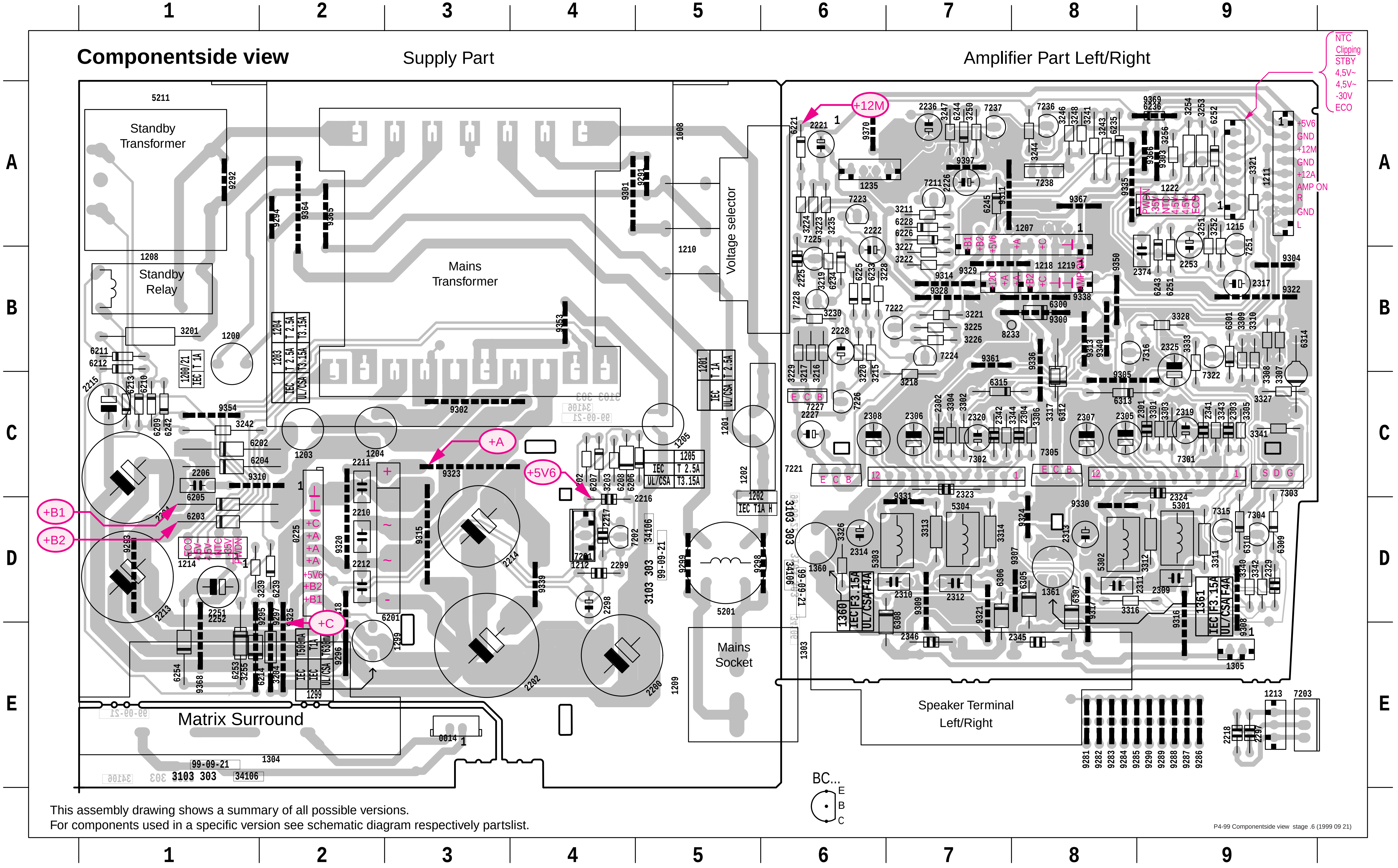
  The DC-level on the amplifier output pins is normally Vcc/2.
  With low signals +C is supplying the amplifiers via decoupling diode 6312. The DC-level on the output pins is therefore approx. 8,6V and approx. 8V on the base of 7315.
  When the output signal increases, also DC-level on base of 7315 increases via diodes 6305, 6306, 6307 and 6308. At a certain output power 7315 becomes slightly conductive and enables low base current for 7304 which becomes conductive too and pulls gate of FET 7303 up to a more positive level. Thus FET 7303 begins to switch through and connects the higher DC supply +B1 slowly to the power stages.
  This does not end up in a hard switching but in a smooth regulating because Vcc is coupled back to the emitter of 7315 via Zener diode 6310. As soon as Vcc increases also the level on emitter 7315 is increased by a 3,9V lower level than Vcc.
  When the output power is increased further +B1 would not be high enough to enable undistorted output signal. The more the output level increases the more increases the DC-level on base of 7315 which causes the transistor more and more conducting until the summary of the voltage drop on 3340+E/B 7304+3342 becomes approx. 1,4V. Now the necessary VBE for a darlington-type transistor is obtained, 7305 begins to switch through and connects the again higher DC supply +A slowly to the power stages. 7305 regulates +A, same as described before for +B.
  7322 and 7316 switch the ripple capacitor 2355, dependent on the output power.
  With low output power the DC-level on base 7322 is approx. 8V. Via Zener diode 6310 and resistor 3333 the emitter is pulled to Vcc (+C at low levels). 7322 is switched through and in turn 7316. The ripple capacitor 2325 is connected to ground and functions as in normal amplifiers. Hum is suppressed and good S/N-ratio is guaranteed even during silent music passages.
  When the supply voltage has to be switched to a higher level the DC-level of the ripple capacitor has to increase in the same relation, otherwise the reference voltages inside the IC would not fit to the actual Vcc. Because of the different delays this relation cannot be obtained and a continuously connected capacitor to the ripple input would cause distortion. For that reason the ripple capacitor 2325 is disconnected as soon as the output power exceeds a certain value. When the output signal increases, also DC-level on base of 7322 increases via diodes 6305, 6306, 6307 and 6308. 7322 blocks and in turn 7316. The ripple capacitor 2325 is disconnected from ground. The circuitry is designed so that 2325 is disconnected just before 7303 begins to switch +B through (see above).

- For Center/Surround-amplifier the function of the Super Class G circuit is similar. Instead of +B1 there +B2 is connected.

- For the /37-versions with two channel-application the so called MATRIX SURROUND is added. The 2 surround-speakers are added in a way, that in case of STEREO a high signal can be measured (up to 10W per speaker at 6 Ohm). In MONO only a few 100mW are available. Result: The widening of the STEREO base is increased without any additional electronic or amplifier.

- In all four channel versions a pre-amplifier out for SURROUND is available to add a wireless speaker system
  (e.g. FB206,FB208).

0014	E	3
0225	D	2
1008	A	3
1200	B	1
1201	C	5
1202	C	5
1203	C	2
1204	C	2
1205	C	5
1207	B	8
1208	B	1
1209	E	5
1210	A	5
1211	A	9
1212	D	4
1213	E	9
1214	D	1
1215	A	9
1218	B	8
1219	B	8
1222	A	9
1235	A	6
1299	E	2
1303	E	7
1304	E	1
1305	E	9
1360	D	6
1361	D	8
2200	E	5
2202	E	4
2204	C	1
2206	C	1
2210	D	2
2211	C	2
2212	D	2
2213	D	1
2214	D	4
2215	C	1
2216	D	4
2217	D	4
2218	E	9
2221	A	6
2222	B	6
2225	B	6
2226	A	7
2227	C	6
2228	B	6
2236	A	7
2251	D	1
2252	D	1
2253	A	9
2297	E	9
2298	D	4
2299	D	4
2301	C	9
2302	C	7
2303	C	9
2304	C	8
2305	C	8
2306	C	7
2307	C	8
2308	C	6
2309	D	9
2310	D	7
2311	D	8
2312	D	7
2313	D	8
2314	D	6
2317	B	9
2319	C	9
2320	C	7
2323	C	7
2324	C	9
2325	B	9
2329	D	9
2341	C	9
2342	C	7
2345	E	8
2346	E	7
2374	B	9
3201	B	1
3202	C	4
3203	C	4
3204	E	2
3211	A	7
3215	B	6
3216	B	6
3217	B	6
3218	C	7
3219	B	6
3220	B	6
3221	B	7
3222	B	7
3223	A	6
3224	A	6
3225	B	7
3226	B	7
3227	B	7
3228	B	6
3229	B	6
3230	B	6
3235	A	6
3239	D	1
3241	A	8
3242	C	1
3243	A	8
3244	A	8
3246	A	8
3247	A	7
3248	A	8
3250	A	7
3251	A	9
3252	B	9
3253	A	9
3254	A	9
3255	E	1
3256	A	9
3301	C	9
3302	C	7
3303	C	9
3304	C	7
3305	C	9
3306	C	8
3307	B	9
3308	B	9
3309	B	9
3310	B	9
3311	D	9
3312	D	9
3313	D	7
3314	D	7
3316	D	8
3317	C	8
3321	A	9
3326	D	6
3327	C	9
3328	B	9
3333	B	9
3340	D	9
3341	C	9
3342	D	9
3343	C	9
3344	C	7
5201	D	5
5211	A	1
5301	D	9
5302	D	8
5303	D	7
5304	D	7
6201	D	2
6202	C	1
6203	D	1
6204	C	1
6205	D	1
6206	C	5
6207	C	4
6208	C	4
6209	C	1
6210	C	1
6211	B	1
6212	B	1
6213	C	1
6214	E	1
6221	A	6
6225	B	6
6226	A	7
6228	A	7
6233	B	6
6234	B	6
6235	A	8
6236	A	9
6239	D	2
6242	C	1
6243	B	9
6244	A	7
6245	A	7
6251	B	9
6252	A	9
6253	E	1
6254	E	1
6300	B	8
6301	B	9
6305	D	8
6306	D	7
6307	D	8
6308	E	6
6309	D	9
6310	D	9
6312	C	8
6313	C	8
6314	C	9
6315	C	7
7201	D	4
7202	D	4
7203	E	9
7211	A	7
7221	C	6
7222	B	7
7223	A	6
7224	B	7
7225	B	6
7226	C	6
7227	C	6
7228	B	6
7236	A	8
7237	A	7
7238	A	8
7251	A	9
7301	C	9
7302	C	7
7303	C	9
7304	D	9
7305	C	8
7315	D	9
7316	B	8
7322	B	9
8233	B	7
9281	E	8
9282	E	8
9283	E	8
9284	E	8
9285	E	8
9286	E	9
9287	E	9
9288	E	9
9289	E	9
9290	E	9
9291	A	5
9292	A	1
9293	D	1
9294	A	2
9295	E	1
9296	E	2
9297	E	2
9298	D	6
9299	D	5
9300	B	8
9301	A	4
9302	C	3
9303	A	9
9304	B	9
9305	C	8
9307	D	8
9308	D	9
9309	D	7
9310	C	1
9311	A	7
9313	B	8
9314	B	7
9315	D	3
9316	E	9
9317	D	8
9318	E	2
9320	D	2
9321	D	7
9322	B	9
9323	C	3
9324	D	8
9325	E	2
9328	B	7
9329	B	7
9330	D	8
9331	D	7
9335	A	8
9336	B	8
9338	B	8
9339	D	4
9340	B	8
9350	B	8
9353	B	4
9354	C	1
9361	B	7
9364	A	2
9365	A	2
9366	A	9
9367	A	8
9368	E	1
9369	A	9
9370	A	6
9397	A	7


1
2
3
4
5
6
7
8
9
A
B
C
D
E
Componentside view
Supply Part
Amplifier Part Left/Right
Standby Transformer
Standby Relay
Mains Transformer
Voltage selector
Matrix Surround
Mains Socket
Speaker Terminal Left/Right
NTC
Clipping
STBY
4,5V~
4,5V~
-30V
ECO
+5V6
GND
+12M
GND
+12A
AMP ON
R
GND
L
+12M
+A
+5V6
+B1
+B2
+C
+C
+A
+A
+A
+5V6
+B2
+B1
ECO
4,5V~
4,5V~
NTC
-35V
PWDN
E C B
S D G
BC...
E
B
C
5211
1208
1200
1008
1210
9292
9294
9364
9365
9301
9291
9353
9302
9354
9310
9323
9315
9320
9339
9368
9296
1203
1204
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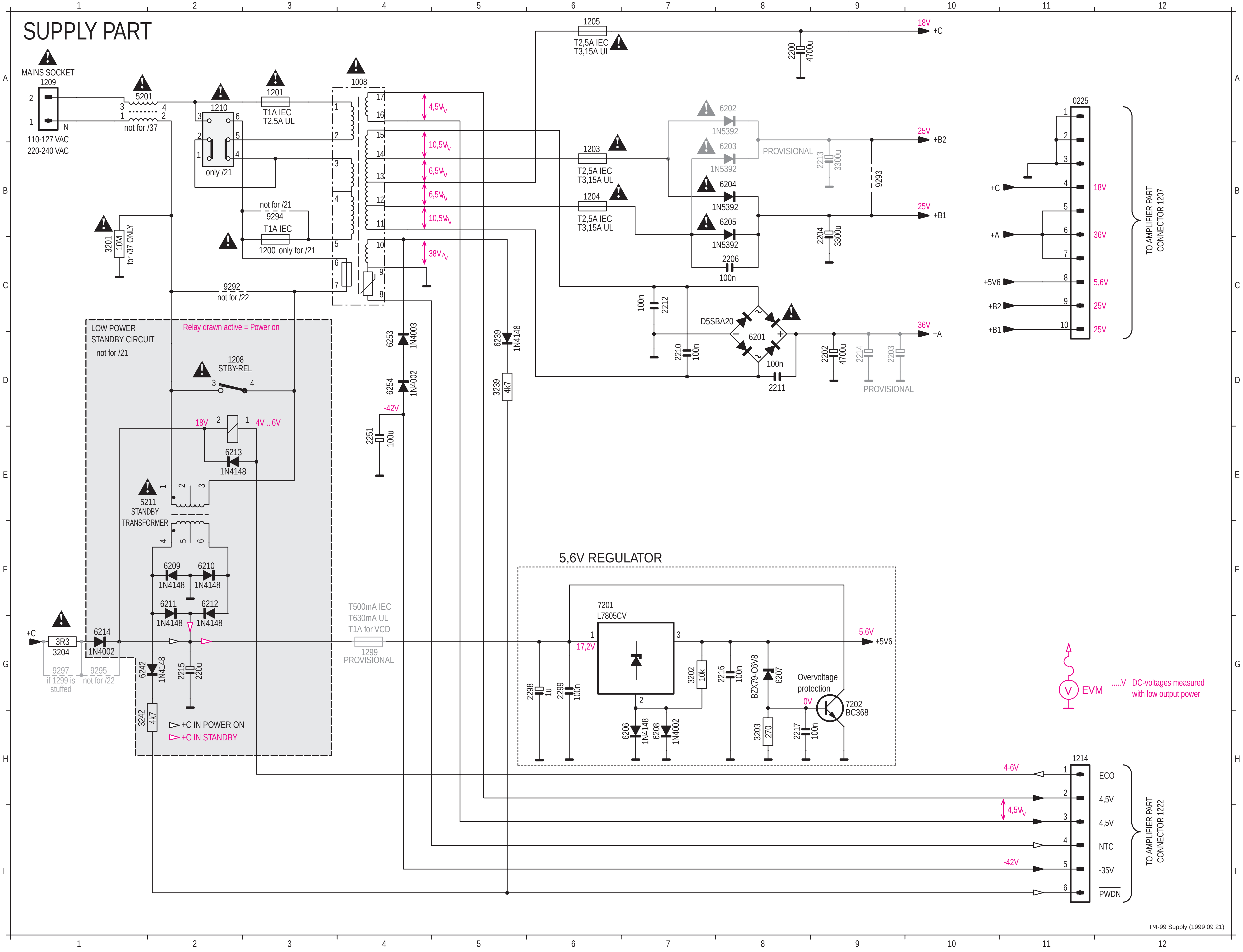
7203
1235
1207
1218 1219
1222
1215
1211
5201
5304
5301
5303
5302
0014
0225
IEC T1A H
IEC T 2.5A
UL/CSA T3.15A
IEC F3.15A
UL/CSA F4A
3103 303
99-09-21
34106

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

P4-99 Componentside view stage .6 (1999 09 21)

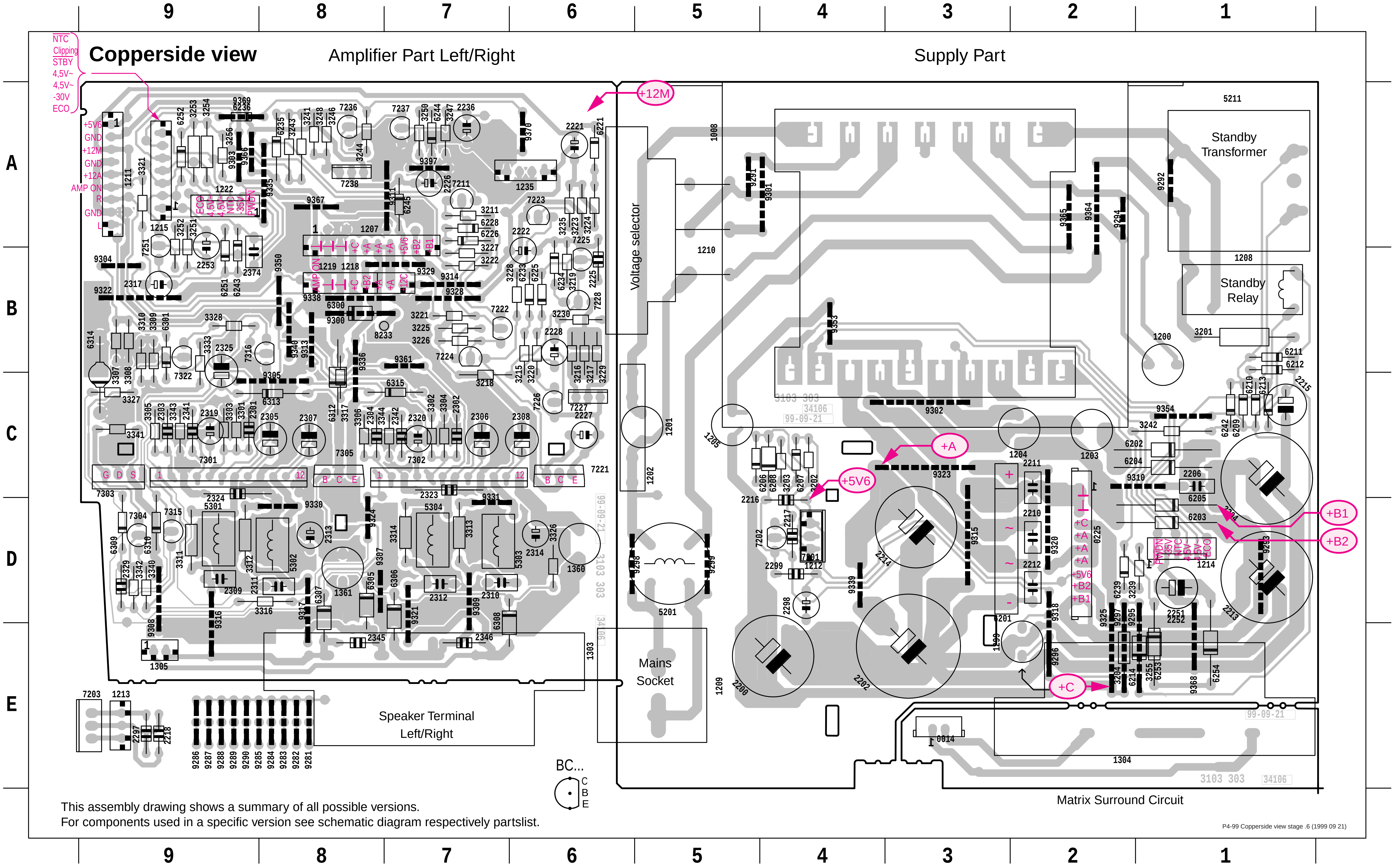
SUPPLY PART


MAINS SOCKET
1209
110-127 VAC
220-240 VAC
N
5201
not for /37
1210
only /21
1201
T1A IEC
T2,5A UL
1008
not for /21
9294
T1A IEC
1200 only for /21
3201
10M
for /37 ONLY
9292
not for /22
1205
T2,5A IEC
T3,15A UL
1203
T2,5A IEC
T3,15A UL
1204
T2,5A IEC
T3,15A UL
4,5V
10,5V
6,5V
6,5V
10,5V
38V
18V
+C
2200
4700u
6202
1N5392
6203
1N5392
PROVISIONAL
2213
3300u
6204
1N5392
6205
1N5392
2206
100n
9293
25V
+B2
25V
+B1
2204
3300u
2212
100n
D5SBA20
6201
2210
100n
100n
2211
36V
+A
2202
4700u
2214
2203
PROVISIONAL
6253
1N4003
6254
1N4002
-42V
2251
100u
6239
1N4148
3239
4K7
LOW POWER
STANDBY CIRCUIT
not for /21
Relay drawn active = Power on
1208
STBY-REL
18V
4V .. 6V
6213
1N4148
5211
STANDBY
TRANSFORMER
6209
1N4148
6210
1N4148
6211
1N4148
6212
1N4148
+C
3R3
3204
6214
1N4002
9297
if 1299 is stuffed
9295
not for /22
6242
1N4148
2215
220u
3242
4k7
+C IN POWER ON
+C IN STANDBY
T500mA IEC
T630mA UL
T1A for VCD
1299
PROVISIONAL
5,6V REGULATOR
7201
L7805CV
17,2V
5,6V
+5V6
2298
1u
2299
100n
6206
1N4148
6208
1N4002
3202
10k
2216
100n
BZX79-C6V8
6207
Overvoltage protection
0V
7202
BC368
3203
270
2217
100n
0225
+C
18V
+A
36V
+5V6
5,6V
+B2
25V
+B1
25V
TO AMPLIFIER PART
CONNECTOR 1207
EVM
.....V DC-voltages measured with low output power
1214
4-6V
ECO
4,5V
4,5V
4,5V
NTC
-42V
-35V
PWDN
TO AMPLIFIER PART
CONNECTOR 1222
P4-99 Supply (1999 09 21)

0225	A11
1008	A 4
1200	B 3
1201	A 3
1202	A 3
1203	B 6
1204	B 6
1205	A 6
1208	D 2
1209	B 1
1210	A 2
1214	I11
2200	A 8
2202	D 9
2203	D 9
2204	B 9
2206	C 8
2210	D 7
2211	D 8
2212	C 7
2213	B 9
2214	D 9
2215	G 2
2216	G 7
2217	H 8
2251	E 4
2298	G 5
2299	G 6
3201	C 1
3202	G 7
3203	H 8
3204	G 1
3239	D 5
3242	H 1
5201	A 1
5211	E 1
6201	C 8
6202	A 8
6203	A 8
6204	B 8
6205	B 8
6206	H 6
6207	G 8
6208	H 7
6209	F 2
6210	F 2
6211	F 2
6212	F 2
6213	E 2
6214	G 1
6239	D 5
6242	G 1
6253	D 4
6254	D 4
7201	F 6
7202	G 9
9292	C 2
9293	B 9
9294	B 3
9295	F 4

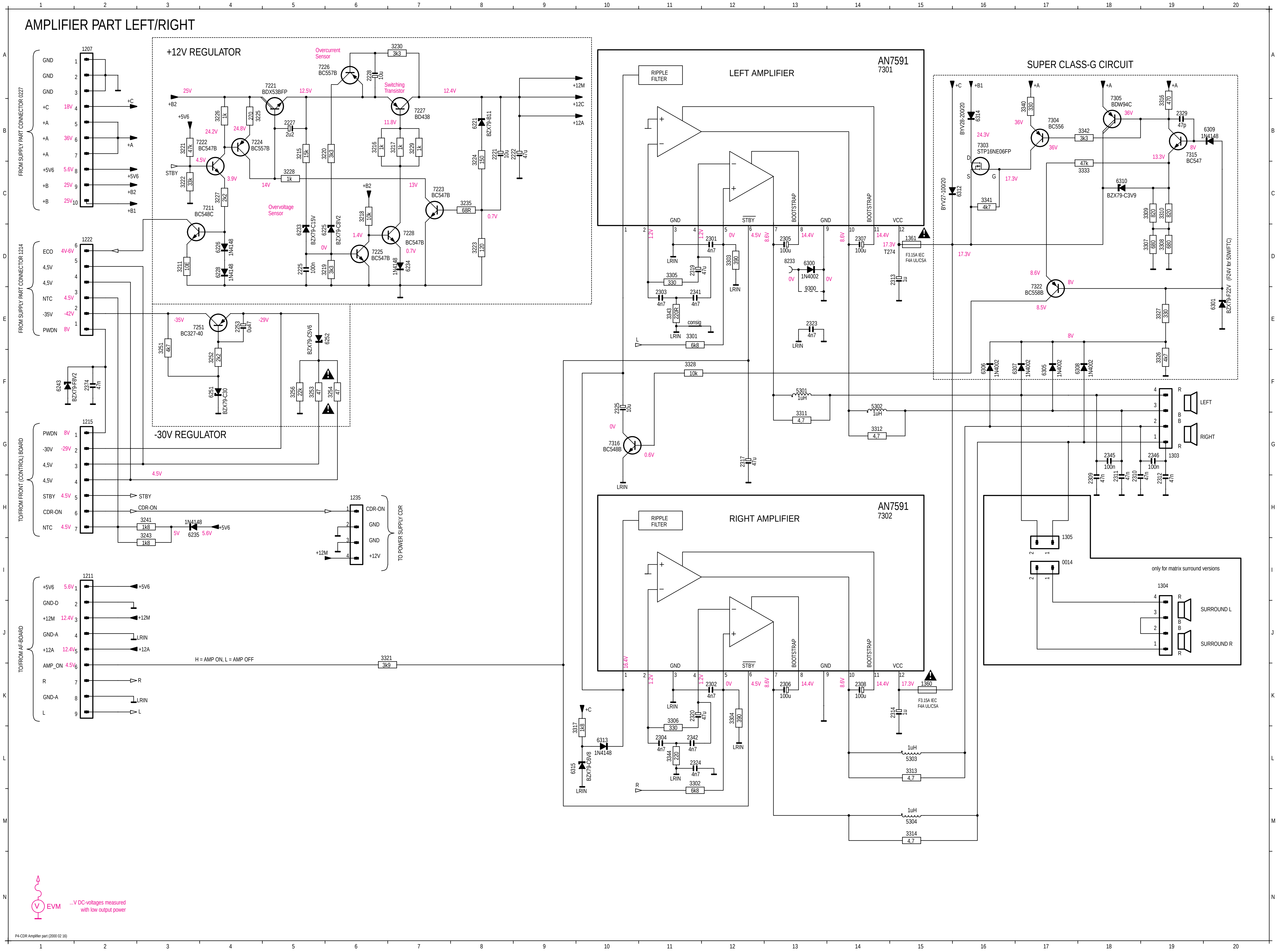
9365 A 2	9329 B 7	9313 B 8	9298 D 6	9285 E 8	7301 C 9	7211 A 7	6305 D 8	6235 A 8	6208 C 4	5201 D 5	3314 D 7	3301 C 9	3242 C 1	3221 B 7	2346 E 7	2312 D 7	2298 D 4	2217 D 4	1360 D 6	1211 A 9	0014 E 3
9366 A 9	9330 D 8	9314 B 7	9299 D 5	9286 E 9	7302 C 7	7221 C 6	6306 D 7	6236 A 9	6209 C 1	5211 A 1	3316 D 8	3302 C 7	3243 A 8	3222 B 7	2374 B 9	2313 D 8	2299 D 4	2218 E 9	1361 D 8	1212 D 4	0225 D 2
9367 A 8	9331 D 7	9315 D 3	9300 B 8	9287 E 9	7303 C 9	7222 B 7	6307 D 8	6239 D 2	6210 C 1	5301 D 9	3317 C 8	3303 C 9	3244 A 8	3223 A 6	3201 B 1	2314 D 6	2301 C 9	2221 A 6	2200 E 5	1213 E 9	1008 A 3
9368 E 1	9335 A 8	9316 E 9	9301 A 4	9288 E 9	7304 D 9	7223 A 6	6308 E 6	6242 C 1	6211 B 1	5302 D 8	3321 A 9	3304 C 7	3246 A 8	3224 A 6	3202 C 4	2317 B 9	2302 C 7	2222 B 6	2202 E 4	1214 D 1	1200 B 1
9369 A 9	9336 B 8	9317 D 8	9302 C 3	9289 E 9	7305 C 8	7224 B 7	6309 D 9	6243 B 9	6212 B 1	5303 D 7	3326 D 6	3305 C 9	3247 A 7	3225 B 7	3203 C 4	2319 C 9	2303 C 9	2225 B 6	2204 C 1	1215 A 9	1201 C 5
9370 A 6	9338 B 8	9318 E 2	9303 A 9	9290 E 9	7315 D 9	7225 B 6	6310 D 9	6244 A 7	6213 C 1	5304 D 7	3327 C 9	3306 C 8	3248 A 8	3226 B 7	3204 E 2	2320 C 7	2304 C 8	2226 A 7	2206 C 1	1218 B 8	1202 C 5
9397 A 7	9339 D 4	9320 D 2	9304 B 9	9291 A 5	7316 B 8	7226 C 6	6312 C 8	6245 A 7	6214 E 1	6201 D 2	3328 B 9	3307 B 9	3250 A 7	3227 B 7	3211 A 7	2323 C 7	2305 C 8	2227 C 6	2210 D 2	1219 B 8	1203 C 2
	9340 B 8	9321 D 7	9305 C 8	9292 A 1	7322 B 9	7227 C 6	6313 C 8	6251 B 9	6221 A 6	6202 C 1	3333 B 9	3308 B 9	3251 A 9	3228 B 6	3215 B 6	2324 C 9	2306 C 7	2228 B 6	2211 C 2	1222 A 9	1204 C 2
	9350 B 8	9322 B 9	9307 D 8	9293 D 1	8233 B 7	7228 B 6	6314 C 9	6252 A 9	6225 B 6	6203 D 1	3340 D 9	3309 B 9	3252 B 9	3229 B 6	3216 B 6	2325 B 9	2307 C 8	2236 A 7	2212 D 2	1235 A 6	1205 C 5
	9353 B 4	9323 C 3	9308 D 9	9294 A 2	9281 E 8	7236 A 8	6315 C 7	6253 E 1	6226 A 7	6204 C 1	3341 C 9	3310 B 9	3253 A 9	3230 B 6	3217 B 6	2329 D 9	2308 C 6	2251 D 1	2213 D 1	1299 E 2	1207 B 8
	9354 C 1	9324 D 8	9309 D 7	9295 E 1	9282 E 8	7237 A 7	7201 D 4	6254 E 1	6228 A 7	6205 D 1	3342 D 9	3311 D 9	3254 A 9	3235 A 6	3218 C 7	2341 C 9	2309 D 9	2252 D 1	2214 D 4	1303 E 7	1208 B 1
	9361 B 7	9325 E 2	9310 C 1	9296 E 2	9283 E 8	7238 A 8	7202 D 4	6300 B 8	6233 B 6	6206 C 5	3343 C 9	3312 D 9	3255 E 1	3239 D 1	3219 B 6	2342 C 7	2310 D 7	2253 A 9	2215 C 1	1304 E 1	1209 E 5
	9364 A 2	9328 B 7	9311 A 7	9297 E 2	9284 E 8	7251 A 9	7203 E 9	6301 B 9	6234 B 6	6207 C 4	3344 C 7	3313 D 7	3256 A 9	3241 A 8	3220 B 6	2345 E 8	2311 D 8	2297 E 9	2216 D 4	1305 E 9	1210 A 5

Copperside view


9
8
7
6
5
4
3
2
1
A
B
C
D
E
Amplifier Part Left/Right
Supply Part
NTC
Clipping
STBY
4,5V~
4,5V~
-30V
ECO
+5V6
GND
+12M
GND
+12A
AMP ON
R
GND
L
+12M
Voltage selector
Standby Transformer
Standby Relay
+A
+5V6
+B1
+B2
+C
Mains Socket
Speaker Terminal Left/Right
Matrix Surround Circuit
BC...
C
B
E
G D S
B C E
1305
7203
1213
5211
1208
1200
1304
0014
3103 303
34106
99-09-21

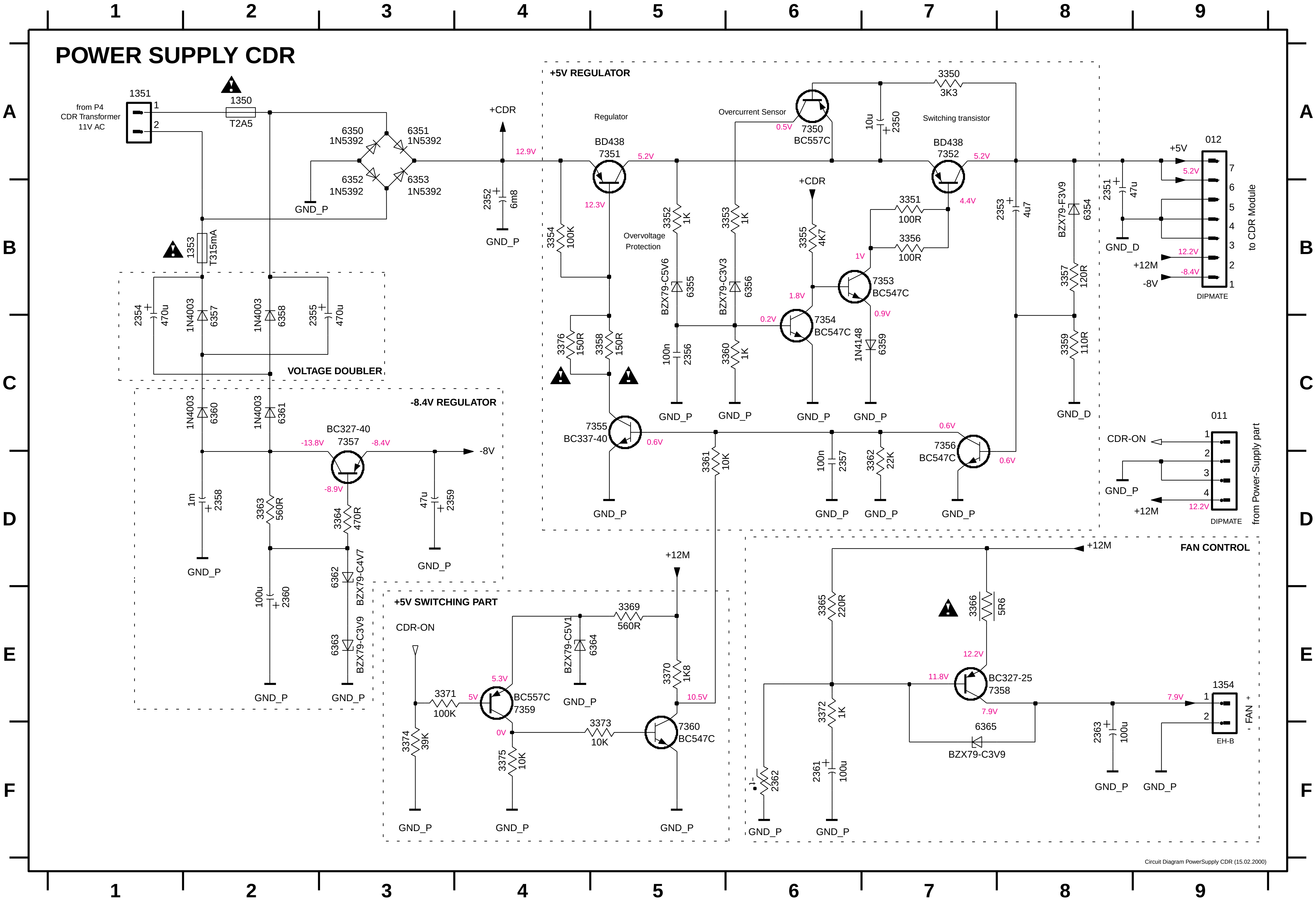
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

AMPLIFIER PART LEFT/RIGHT


+12V REGULATOR
-30V REGULATOR
LEFT AMPLIFIER
RIGHT AMPLIFIER
AN7591
7301
7302
SUPER CLASS-G CIRCUIT
RIPPLE FILTER
GND
STBY
BOOTSTRAP
VCC
FROM SUPPLY PART CONNECTOR 0227
FROM SUPPLY PART CONNECTOR 1214
TO/FROM FRONT (CONTROL) BOARD
TO/FROM AF-BOARD
TO POWER SUPPLY CDR
1207
1222
1215
1211
1235
1303
1304
1305
0014
Overcurrent Sensor
Switching Transistor
Overvoltage Sensor
7221 BDX53BFP
7226 BC557B
7227 BD438
7224 BC557B
7222 BC547B
7211 BC548C
7223 BC547B
7225 BC547B
7228 BC547B
7251 BC327-40
7316 BC548B
7303 STP16NE06FP
7304 BC556
7305 BDW94C
7315 BC547
7322 BC558B
H = AMP ON, L = AMP OFF
LEFT
RIGHT
SURROUND L
SURROUND R
only for matrix surround versions
F3.15A IEC F4A UL/CSA
EVM
...V DC-voltages measured with low output power
P4-CDR Amplifier part (2000 02 16)

0014	I17
1207	A 2
1211	I 2
1215	G 2
1218	M20
1219	M20
1222	D 2
1235	H 6
1303	G 9
1304	I19
1305	I17
1360	K15
1361	D15
2221	B 8
2222	B 9
2225	D 5
2226	M 7
2227	B 5
2228	A 6
2236	M 6
2253	E 4
2301	D12
2302	K12
2303	E11
2304	L11
2305	D13
2306	K13
2307	D14
2308	K14
2309	H18
2310	H18
2311	H18
2312	H19
2313	D15
2314	K15
2317	G12
2319	D11
2320	K11
2323	E13
2324	L11
2325	F10
2329	B19
2341	E11
2342	L11
2345	G18
2346	G19
2374	F 2
3211	D 3
3215	B 5
3216	B 6
3217	B 7
3218	C 6
3219	D 6
3220	B 6
3221	B 3
3222	C 3
3223	D 8
3224	B 8
3225	B 4
3226	B 4
3227	C 4
3228	C 5
3229	B 7
3230	A 7
3235	C 8
3241	H 3
3243	H 3
3244	M 5
3246	M 5
3247	N 6
3248	L 4
3250	M 6
3251	E 3
3252	F 4
3253	F 5
3254	F 6
3256	F 5
3301	E11
3302	L11
3303	D12
3304	K12
3305	D11
3306	K11
3307	D19
3308	D19
3309	C19
3310	C19
3311	G13
3312	G14
3313	L15
3314	M15
3316	B19
3317	L10
3321	J 6
3326	F19
3327	E19
3328	F11
3333	C18
3340	B17
3341	C16
3342	B18
3343	E11
3344	L11
5301	F13
5302	F14
5303	L15
5304	M15
6221	B 8
6225	D 6
6226	D 4
6228	D 4
6233	D 5
6234	D 7
6235	H 3
6236	M 5
6243	F 1
6244	M 6
6245	K 5
6251	F 4
6252	E 5
6300	D13
6301	E20
6305	F17
6306	F16
6307	F17
6308	F18
6309	B20
6310	C18
6312	C16
6313	L10
6314	B16
6315	L 9
7211	C 4
7221	A 5
7222	B 3
7223	C 7
7224	B 4
7225	D 6
7226	A 5
7227	B 7
7228	D 7
7236	M 5
7237	M 6
7238	L 5
7251	E 3
7301	A15
7302	H15
7303	B16
7304	B17
7305	B18
7315	B19
7316	G10
7322	E17
8233	D13
9281	K17
9282	K17
9283	L17
9284	L17
9285	L17
9286	L17
9287	M17
9288	M17
9289	M17
9290	N17
9300	E13

POWER SUPPLY CDR

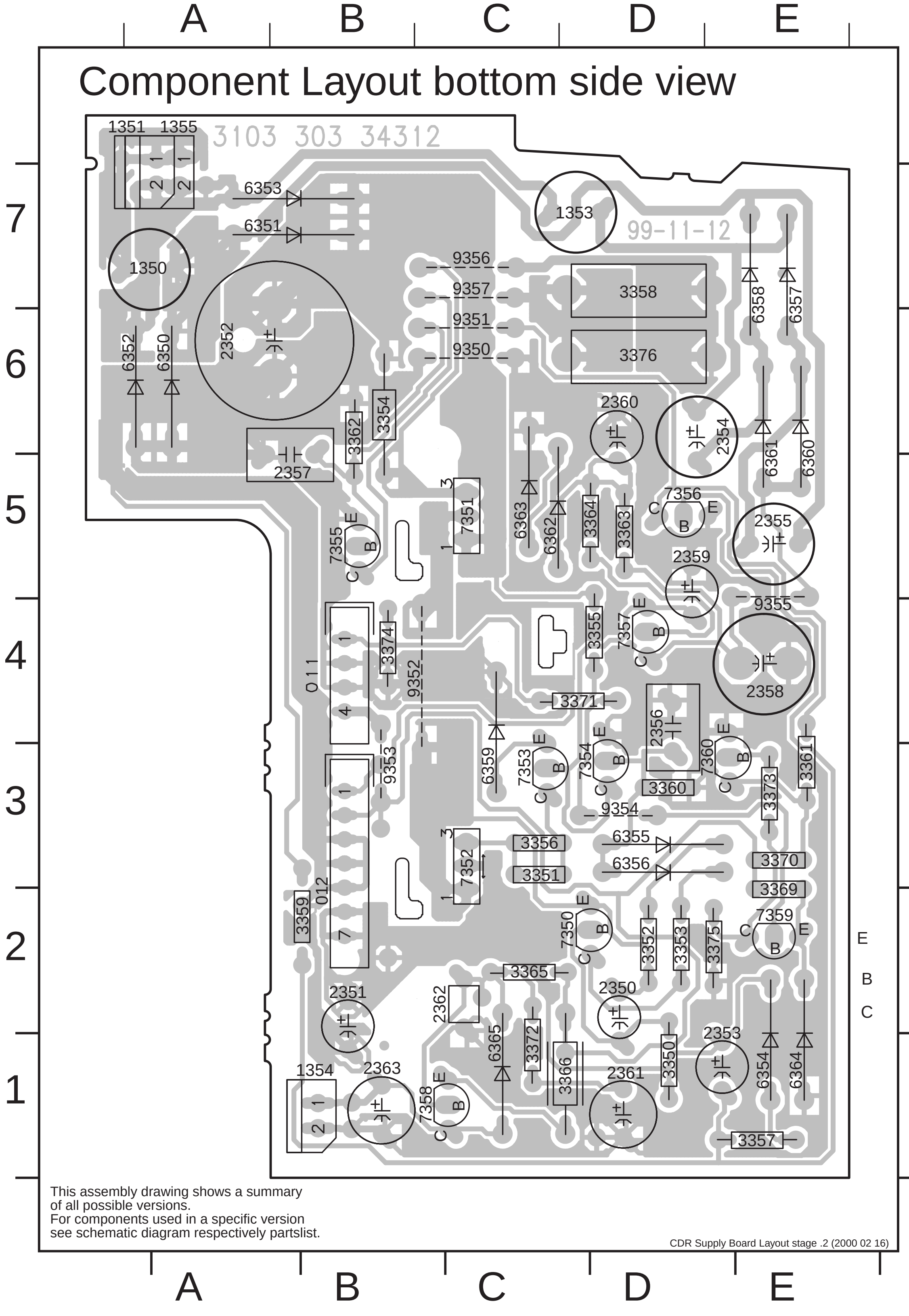

1 2 3 4 5 6 7 8 9
A B C D E F
1351
from P4
CDR Transformer
11V AC
1
2
1350
T2A5
6350
1N5392
6351
1N5392
6352
1N5392
6353
1N5392
GND_P
+CDR
12.9V
2352
6m8
GND_P
1353
T315mA
2354
470u
1N4003
6357
1N4003
6358
2355
470u
VOLTAGE DOUBLER
+5V REGULATOR
Regulator
BD438
7351
5.2V
12.3V
3354
100K
Overvoltage Protection
3352
1K
BZX79-C5V6
6355
100n
2356
Overcurrent Sensor
0.5V
7350
BC557C
3353
1K
BZX79-C3V3
6356
3360
1K
0.2V
7354
BC547C
10u
2350
3350
3K3
Switching transistor
BD438
7352
5.2V
4.4V
+CDR
3355
4K7
3351
100R
3356
100R
1V
1.8V
7353
BC547C
0.9V
1N4148
6359
2353
4u7
BZX79-F3V9
6354
3357
120R
3359
110R
GND_D
2351
47u
GND_D
+5V
012
5.2V
12.2V
-8.4V
+12M
-8V
7 6 5 4 3 2 1
DIPMATE
to CDR Module
3376
150R
3358
150R
7355
BC337-40
0.6V
3361
10K
100n
2357
3362
22K
0.6V
7356
BC547C
0.6V
GND_P
-8.4V REGULATOR
1N4003
6360
1N4003
6361
BC327-40
7357
-13.8V
-8.4V
-8V
-8.9V
1m
2358
3363
560R
3364
470R
47u
2359
6362
BZX79-C4V7
100u
2360
6363
BZX79-C3V9
011
CDR-ON
1 2 3 4
+12M
12.2V
DIPMATE
from Power-Supply part
+5V SWITCHING PART
CDR-ON
3371
100K
5V
5.3V
BC557C
7359
0V
3374
39K
3375
10K
BZX79-C5V1
6364
3369
560R
+12M
3370
1K8
10.5V
3373
10K
7360
BC547C
FAN CONTROL
+12M
3365
220R
3366
5R6
12.2V
11.8V
BC327-25
7358
7.9V
6365
BZX79-C3V9
3372
1K
2361
100u
2362
2363
100u
7.9V
1354
1 2
FAN
EH-B

Circuit Diagram PowerSupply CDR (15.02.2000)

011	C9
012	A9
1350	A2
1351	A1
1353	B2
1354	E9
1355	A1
2350	A7
2351	B8
2352	B4
2353	B8
2354	C1
2355	C2
2356	C5
2357	D6
2358	D2
2359	D3
2360	E2
2361	F6
2362	F6
2363	F8
3350	A7
3351	B7
3352	B5
3353	B6
3354	B4
3355	B6
3356	B7
3357	B8
3358	C5
3359	C8
3360	C6
3361	D5
3362	D7
3363	D2
3364	D3
3365	E6
3366	E7
3369	E5
3370	E5
3371	E3
3372	E6
3373	F5
3374	F3
3375	F4
3376	C4
6350	A3
6351	A3
6352	B3
6353	B3
6354	B8
6355	B5
6356	B6
6357	C2
6358	C2
6359	C7
6360	C2
6361	C2
6362	D3
6363	E3
6364	E4
6365	F7
7350	A6
7351	A5
7352	A7
7353	B7
7354	C6
7355	C5
7356	C7
7357	C3
7358	E7
7359	E4
7360	F5

011	B4
012	B3
1350	A7
1351	A7
1353	D7
1354	B1
1355	A7
2350	D2
2351	B2
2352	B7
2353	E2
2354	E5
2355	E5
2356	D4
2357	B5
2358	E4
2359	D5
2360	D6
2361	D1
2362	C2
2363	B1
3350	D1
3351	C2
3352	D2
3353	D2
3354	B6
3355	D4
3356	C3
3357	E1
3358	D7
3359	B3
3360	D3
3361	E3
3362	B5
3363	D5
3364	D5
3365	C2
3366	D1
3369	E2
3370	E3
3371	D4
3372	C1
3373	E3
3374	B4
3375	E2
3376	D6
6350	A6
6351	A7
6352	A6
6353	A7
6354	E1
6355	D3
6356	D3
6357	E7
6358	E7
6359	C4
6360	E6
6361	E6
6362	D5
6363	C5
6364	E1
6365	C1
7350	D2
7351	C5
7352	C3
7353	C3
7354	D3
7355	B5
7356	D5
7357	D4
7358	C1
7359	E2
7360	E3
9350	C6
9351	C6
9352	C4
9353	B3
9354	D3
9355	E4
9356	C7
9357	C6

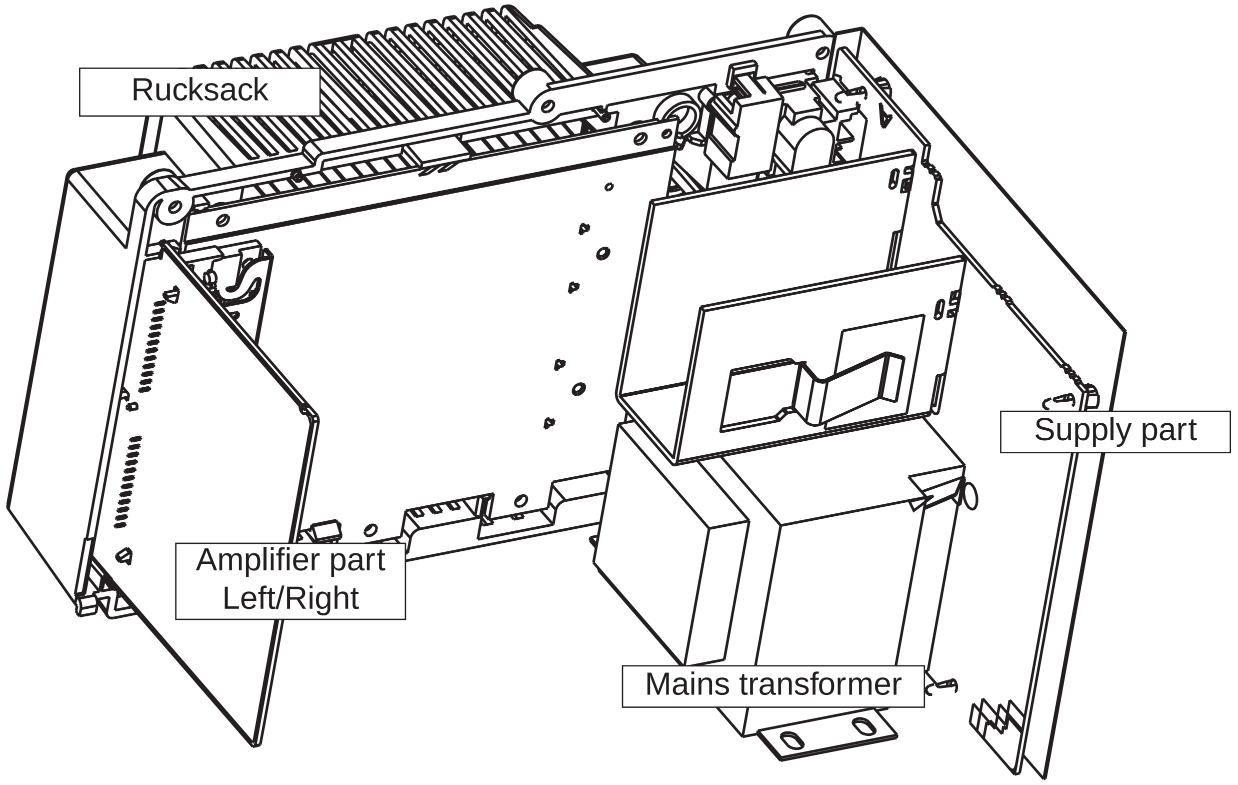
Component Layout bottom side view


A
B
C
D
E
7
6
5
4
3
2
1
1351
1355
3103 303 34312
6353
6351
1353
99-11-12
1350
9356
9357
9351
9350
3358
3376
6352
6350
2352
6358
6357
2360
2354
3362
3354
2357
6361
6360
7356
7351
6363
6362
3364
3363
2355
7355
2359
9355
011
3374
9352
3355
7357
2358
3371
2356
9353
6359
7353
7354
7360
3361
3360
3373
9354
6355
6356
3356
3351
3370
3369
7352
3359
012
7350
3352
3353
3375
7359
3365
2351
2362
2350
2353
6365
3372
6354
6364
1354
2363
7358
3366
2361
3350
3357
E
B
C

This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

CDR Supply Board Layout stage .2 (2000 02 16)

PARTSLIST POWER4 MODULE


Rucksack
Supply part
Amplifier part
Left/Right
Mains transformer

MECHANICAL PARTSLIST POWER4 MODULE

0201	4822 426 10607	RUCKSACK
0215	4822 492 11735	SPRING TRANSISTOR
0222	3103 304 07050	INSULATING WASHER (TO126)
0255	4822 255 40179	SPRING CLIP TO220
1003	4822 361 11161	KD1206PTS3, FAN

ELECTRICAL PARTSLIST POWER4 MODULE

MISCELLANEOUS

1200 ⚠	4822 071 51002	FUSE T1A
1201 ⚠	4822 071 51002	FUSE T1A
1201 ⚠	4822 253 50137	FUSE T 2,5A UL
1203 ⚠	4822 071 52502	FUSE T 2,5A
1203 ⚠	4822 252 51121	FUSE T3,15A UL
1204 ⚠	4822 071 52502	FUSE T 2,5A
1204 ⚠	4822 252 51121	FUSE T3,15A UL
1205 ⚠	4822 071 52502	FUSE T 2,5A
1205 ⚠	4822 252 51121	FUSE T3,15A UL
1208 ⚠	2422 132 07402	RELAY 1P 12V
1209 ⚠	4822 265 31015	MAINS SOCKET, IEC
1209 ⚠	4822 265 31016	MAINS SOCKET, UL
1210 ⚠	4822 272 10269	VOLTAGE SELECTOR
1303	4822 267 31176	SPEAKER TERMINAL
1350 ⚠	4822 071 52502	FUSE T 2,5A
1353 ⚠	4822 071 53151	FUSE 315mA
1360 ⚠	4822 252 11225	FUSE F3.15A IEC 250V
1360 ⚠	4822 252 11226	FUSE F4A UL/CSA 250V
1361 ⚠	4822 252 11225	FUSE F3.15A IEC 250V
1361 ⚠	4822 252 11226	FUSE F4A UL/CSA 250V
5211 ⚠	3103 308 30590	TRANSFORMER, STANDBY /37
5211 ⚠	4822 146 10756	TRANSFORMER, STANDBY

CAPACITORS

2200	2020 012 93403	4700µF	20%	25V
2202	4822 124 80415	4700µF	20%	50V
2204	4822 124 42367	3300µF	20%	35V
2206	5322 121 42386	100nF	5%	63V
2309	4822 124 21913	1µF	20%	63V
2210	5322 121 42386	100nF	5%	63V
2211	5322 121 42386	100nF	5%	63V
2212	5322 121 42386	100nF	5%	63V
2215	4822 124 80144	220µF	20%	25V
2216	4822 126 12882	100nF	20%	50V
2217	4822 126 12882	100nF	20%	50V
2221	4822 124 40248	10µF	20%	63V
2222	4822 124 40433	47µF	20%	25V
2225	4822 126 12882	100nF	20%	50V
2227	4822 124 22652	2,2µF	20%	50V
2228	4822 124 40248	10µF	20%	63V
2251	4822 124 40255	100µF	20%	50V
2253	4822 124 41407	0,47µF	20%	63V
2299	4822 126 12882	100nF	20%	50V
2301	4822 126 11714	4,7nF	20%	16V
2302	4822 126 11714	4,7nF	20%	16V
2303	4822 126 11714	4,7nF	20%	16V
2304	4822 126 11714	4,7nF	20%	16V
2305	4822 124 40207	100µF	20%	25V
2306	4822 124 40207	100µF	20%	25V
2307	4822 124 40207	100µF	20%	25V
2308	4822 124 40207	100µF	20%	25V
2309	4822 121 43526	47nF	5%	100V
2310	4822 121 43526	47nF	5%	100V
2311	4822 121 43526	47nF	5%	100V
2312	4822 121 43526	47nF	5%	100V
2313	4822 124 21913	1µF	20%	63V
2314	4822 124 21913	1µF	20%	63V
2317	4822 124 40433	47µF	20%	25V
2319	4822 124 40433	47µF	20%	25V

ELECTRICAL PARTSLIST POWER4 MODULE

CAPACITORS

2320	4822 124 40433	47µF	20%	25V
2323	4822 126 11714	4,7nF	20%	16V
2324	4822 126 11714	4,7nF	20%	16V
2325	4822 124 40248	10µF	20%	63V
2329	4822 122 33848	47pF	5%	50V
2341	4822 126 11714	4,7nF	20%	16V
2342	4822 126 11714	4,7nF	20%	16V
2345	4822 126 12882	100nF	20%	50V
2346	4822 126 12882	100nF	20%	50V
2350	4822 124 11947	10µF	20%	16V
2351	4822 124 40433	47µF	20%	25V
2352	4822 124 12328	6800µF	20%	16V
2353	4822 124 40769	4,7µF	20%	100V
2354	4822 124 80791	470µF	20%	16V
2355	4822 124 80791	470µF	20%	16V
2356	5322 121 42386	100nF	5%	63V
2357	5322 121 42386	100nF	5%	63V
2358	4822 124 81144	1000µF	20%	16V
2359	4822 124 40433	47µF	20%	25V
2360	4822 124 41584	100µF	20%	10V
2361	4822 124 23052	100µF	20%	16V
2363	4822 124 23052	100µF	20%	16V
2374	4822 121 43526	47nF	5%	100V

RESISTORS

2362	4822 117 12063	10kΩ		NTC
3201 ⚠	4822 053 21106	10MΩ	5%	0,5W
3202	4822 050 21003	10kΩ	2%	0,25W
3203	4822 116 83876	270Ω	5%	0.16W
3204 ⚠	4822 052 10338	3,3Ω		NFR25
3211	4822 116 52176	10Ω	5%	0,5W
3215	4822 116 52244	15kΩ	5%	0,5W
3216	4822 050 11002	1kΩ	5%	0,2W
3217	4822 050 11002	1kΩ	5%	0,2W
3218	4822 050 21003	10kΩ	2%	0,25W
3219	4822 116 52269	3,3kΩ	5%	0,5W
3220	4822 116 52269	3,3kΩ	5%	0,5W
3221	4822 116 83884	47kΩ	5%	0,16W
3222	4822 050 23303	33kΩ	1%	0,6W
3223	4822 116 52206	120Ω	5%	0,5W
3224	4822 116 83868	150Ω	5%	0,5W
3225	4822 116 83876	270Ω	5%	0.16W
3226	4822 050 11002	1kΩ	5%	0,2W
3227	4822 116 52256	2,2kΩ	5%	0,16W
3228	4822 050 11002	1kΩ	5%	0,2W
3229	4822 050 11002	1kΩ	5%	0,2W
3230	4822 116 52269	3,3kΩ	5%	0,5W
3235	4822 116 52199	68Ω	5%	0,16W
3239	4822 116 52283	4,7kΩ	5%	0,5W
3241	4822 116 52249	1,8kΩ	5%	0,16W
3242	4822 116 52283	4,7kΩ	5%	0,5W
3243	4822 116 52249	1,8kΩ	5%	0,16W
3251	4822 116 52283	4,7kΩ	5%	0,5W
3252	4822 116 52256	2,2kΩ	5%	0,16W
3253 ⚠	4822 052 10479	47Ω	5%	0,3W
3254 ⚠	4822 052 10479	47Ω	5%	0,3W
3256	4822 116 52257	22kΩ	5%	0,5W
3301	4822 116 83961	6,8kΩ	5%	0,16W
3302	4822 116 83961	6,8kΩ	5%	0,16W
3303	4822 116 83881	390Ω	5%	0,5W

RESISTORS

3304	4822 116 83881	390Ω	5%	0,5W
3305	4822 116 52219	330Ω	5%	0,5W
3306	4822 116 52219	330Ω	5%	0,5W
3307	4822 116 52228	680Ω	5%	0,5W
3308	4822 116 52228	680Ω	5%	0,5W
3309	4822 116 52231	820Ω	5%	0,5W
3310	4822 116 52231	820Ω	5%	0,5W
3311	4822 050 24708	4,7Ω	1%	0,6W
3312	4822 050 24708	4,7Ω	1%	0,6W
3313	4822 050 24708	4,7Ω	1%	0,6W
3314	4822 050 24708	4,7Ω	1%	0,6W
3316	4822 116 83883	470Ω	5%	0,16W
3317	4822 116 52249	1,8kΩ	5%	0,16W
3321	4822 116 52276	3,9kΩ	5%	0,5W
3326	4822 116 52283	4,7kΩ	5%	0,5W
3327	4822 116 52219	330Ω	5%	0,5W
3328	4822 050 21003	10kΩ	2%	0,25W
3333	4822 116 83884	47kΩ	5%	0,16W
3340	4822 116 52219	330Ω	5%	0,5W
3341	4822 116 52283	4,7kΩ	5%	0,5W
3342	4822 116 52269	3,3kΩ	5%	0,5W
3343	4822 116 83872	220Ω	5%	0,5W
3344	4822 116 83872	220Ω	5%	0,5W
3350	4822 116 52269	3,3kΩ	5%	0,5W
3351	4822 116 52175	100Ω	5%	0,5W
3352	4822 050 11002	1kΩ	5%	0,2W
3353	4822 050 11002	1kΩ	5%	0,2W
3354	4822 116 52234	100kΩ	5%	0,5W
3355	4822 116 52283	4,7kΩ	5%	0,5W
3356	4822 116 52175	100Ω	5%	0,5W
3357	4822 116 52206	120Ω	5%	0,5W
3358 ⚠	4822 053 11151	150Ω	5%	2W
3359	4822 050 21101	110Ω	1%	0,6W
3360	4822 050 11002	1kΩ	5%	0,2W
3361	4822 050 21003	10kΩ	2%	0,25W
3362	4822 116 52257	22kΩ	5%	0,5W
3363	4822 116 52226	560Ω	5%	0,5W
3364	4822 116 83883	470Ω	5%	0,16W
3365	4822 116 83872	220Ω	5%	0,5W
3366 ⚠	4822 052 10568	5,6Ω	5%	0,33W
3369	4822 116 52226	560Ω	5%	0,5W
3370	4822 116 52249	1,8kΩ	5%	0,16W
3371	4822 116 52234	100kΩ	5%	0,5W
3372	4822 050 11002	1kΩ	5%	0,2W
3373	4822 050 21003	10kΩ	2%	0,25W
3374	4822 116 83882	39kΩ	5%	0,5W
3375	4822 050 21003	10kΩ	2%	0,25W
3376 ⚠	4822 053 11151	150Ω	5%	2W

COILS

5201 ⚠	4822 157 11832	400µH
5301	4822 157 62255	COIL 18,5 TURNS
5302	4822 157 62255	COIL 18,5 TURNS
5303	4822 157 62255	COIL 18,5 TURNS
5304	4822 157 62255	COIL 18,5 TURNS

DIODES

6201 ⚠	4822 130 82078	D5SBA20
6204 ⚠	5322 130 80686	1N5392
6205 ⚠	5322 130 80686	1N5392
6206	4822 130 30621	1N4148
6207	4822 130 34278	BZX79-C6V8

ELECTRICAL PARTSLIST POWER4 MODULE

DIODES

6208	4822 130 31878	1N4003G
6209	4822 130 30621	1N4148
6210	4822 130 30621	1N4148
6211	4822 130 30621	1N4148
6212	4822 130 30621	1N4148
6213	4822 130 30621	1N4148
6214	4822 130 31878	1N4003G
6221	9331 668 80133	DIO REG BZX79-B11
6225	4822 130 34382	BZX79-B8V2
6226	4822 130 30621	1N4148
6228	4822 130 30621	1N4148
6233	4822 130 31024	BZX79-C18
6234	4822 130 30621	1N4148
6235	4822 130 30621	1N4148
6239	4822 130 30621	1N4148
6242	4822 130 30621	1N4148
6243	3198 010 58280	BZX79-B8V2
6251	4822 130 34328	BZX79-C30
6252	4822 130 34173	BZX79-B5V6
6253	4822 130 31878	1N4003G
6254	4822 130 31878	1N4003G
6300	4822 130 31878	1N4003G
6301	9338 872 90673	BZX55-F24
6305	4822 130 31878	1N4003G
6306	4822 130 31878	1N4003G
6307	4822 130 31878	1N4003G
6308	4822 130 31878	1N4003G
6309	4822 130 30621	1N4148
6310	4822 130 31981	BZX79-B3V9
6312	4822 130 10871	SBYV27
6313	4822 130 30621	1N4148
6314	4822 130 80791	BYV28-200/20
6315	4822 130 34278	BZX79-C6V8
6350	5322 130 80686	1N5392
6351	5322 130 80686	1N5392
6352	5322 130 80686	1N5392
6353	5322 130 80686	1N5392
6354	3198 010 53980	DIO REG BZX79-B3V9
6355	4822 130 34173	BZX79-B5V6
6356	5322 130 31504	BZX79-B3V3
6357	4822 130 31878	1N4003G
6358	4822 130 31878	1N4003G
6359	4822 130 30621	1N4148
6360	4822 130 31878	1N4003G
6361	4822 130 31878	1N4003G
6362	4822 130 34174	BZX79-B4V7
6363	4822 130 31981	BZX79-B3V9
6364	4822 130 34233	BZX79-B5V1
6365	4822 130 31981	BZX79-B3V9

TRANSISTORS

7202	9332 592 40126	BC368
7211	4822 130 44503	BC547C
7221	9322 139 23687	BDX53BFP
7222	4822 130 40959	BC547B
7223	4822 130 40959	BC547B
7224	4822 130 41691	BC556B
7225	4822 130 40959	BC547B
7226	4822 130 41691	BC556B
7227	4822 130 40995	BD438
7228	4822 130 40959	BC547B

TRANSISTORS

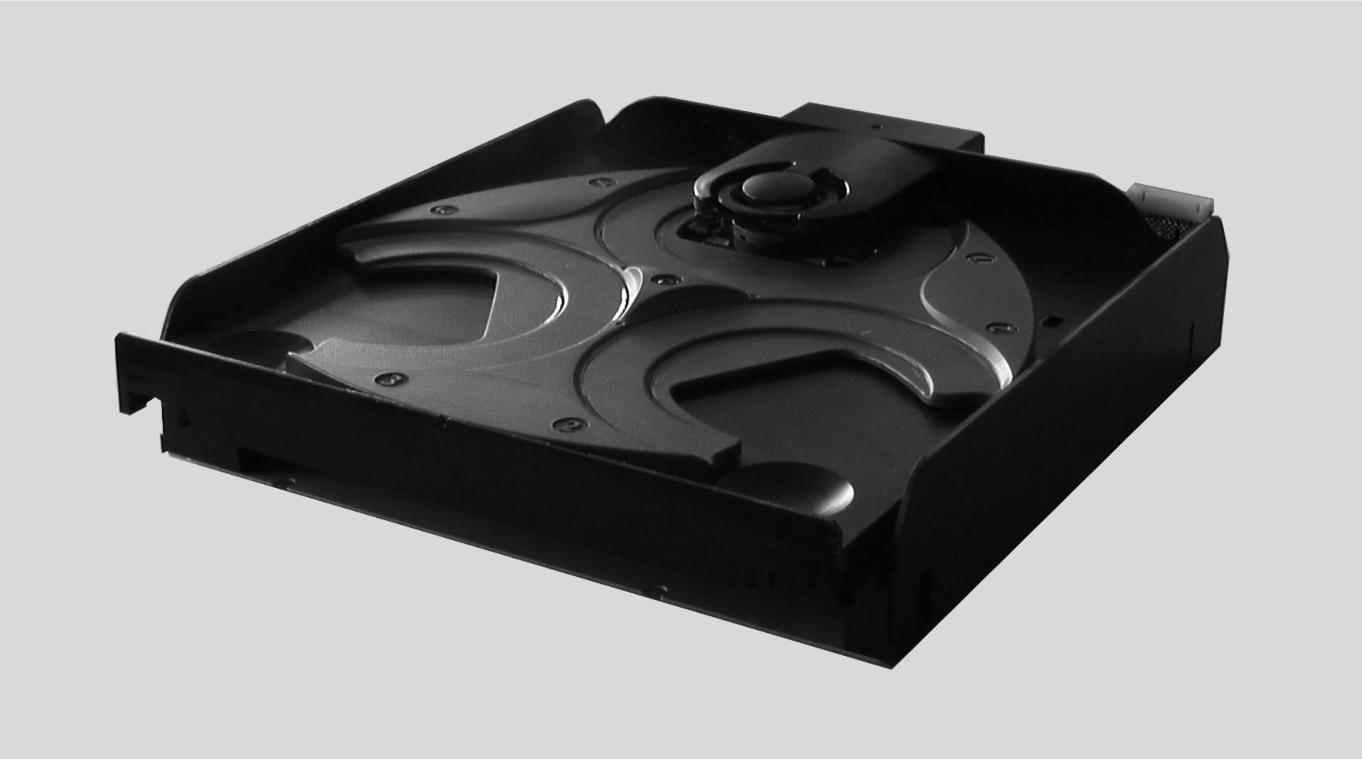
7251	4822 130 41327	BC327-40
7303	4822 130 11336	STP16NE06FP
7304	4822 130 41691	BC556B
7305	4822 130 10847	BDW94C
7315	4822 130 40959	BC547B
7316	4822 130 40959	BC547B
7322	4822 130 44568	BC557B
7350	9336 500 90126	BC557C
7351	4822 130 40995	BD438
7352	4822 130 40995	BD438
7353	4822 130 44503	BC547C
7354	4822 130 44503	BC547C
7355	4822 130 41344	BC337-40
7356	4822 130 44503	BC547C
7357	4822 130 41327	BC327-40
7358	4822 130 41246	BC327-25
7359	9336 500 90126	BC557C
7360	4822 130 44503	BC547C

INTEGRATED CIRCUITS

7201	4822 209 80817	L7805CV
7301	9322 153 02682	AN7591, POWER STAGE
7302	9322 153 02682	AN7591, POWER STAGE

MAINS TRANSFORMER

1008	3103 308 30540	TRANSFORMER MAINS FOR /37
1008	3103 308 30550	TRANSFORMER MAINS FOR /22
1008	3103 308 30560	TRANSFORMER MAINS FOR /21



3CDC99-DS Module

(3 Disc Carousel Changer)

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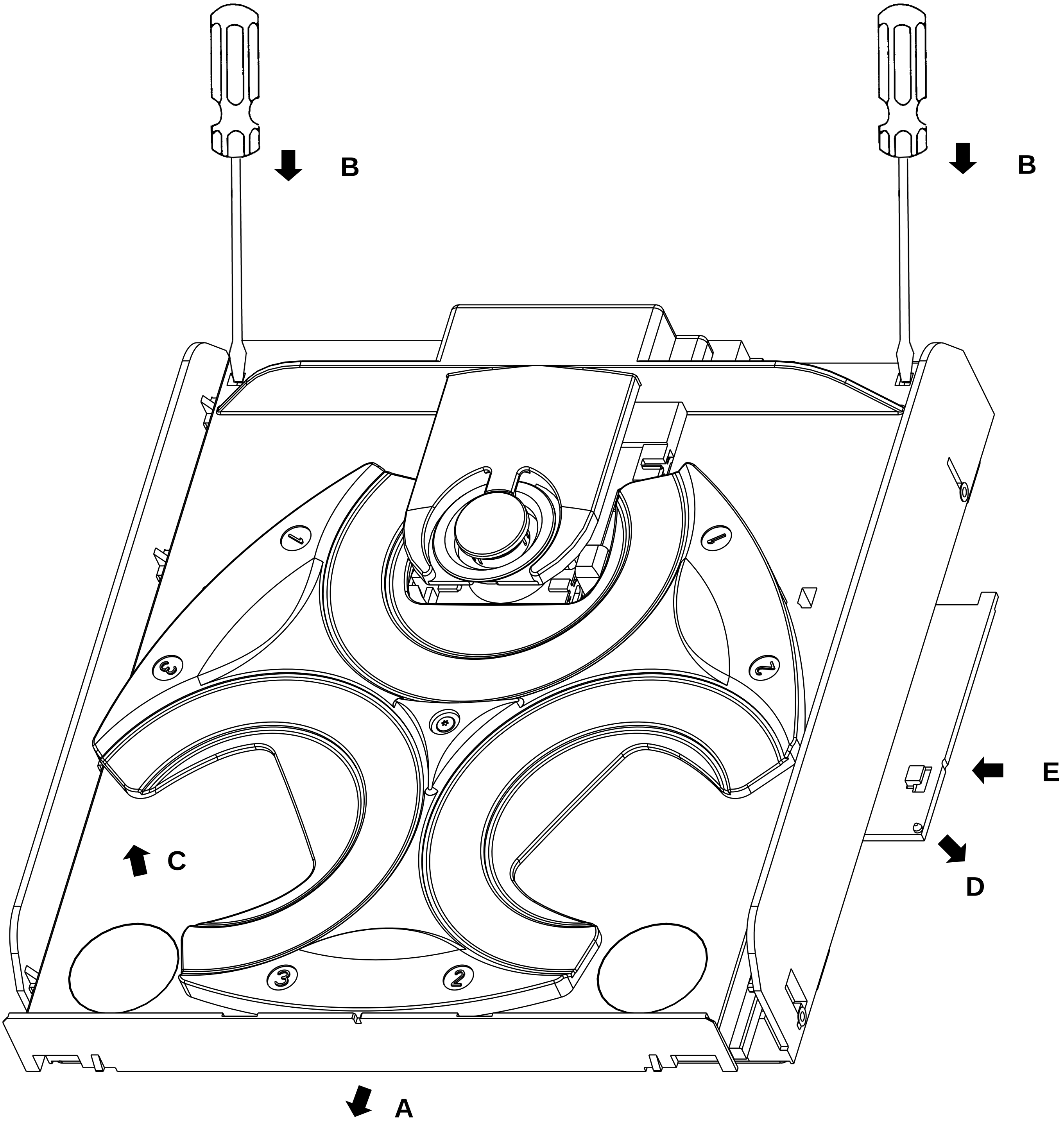
Dismantling Hints



Dismantling of Drawer

→ **A** Pull drawer outwards
→ **B** Unlock drawer with screwdriver
→ **C** Lift drawer to demount from chassis

Dismantling of Flex Plate

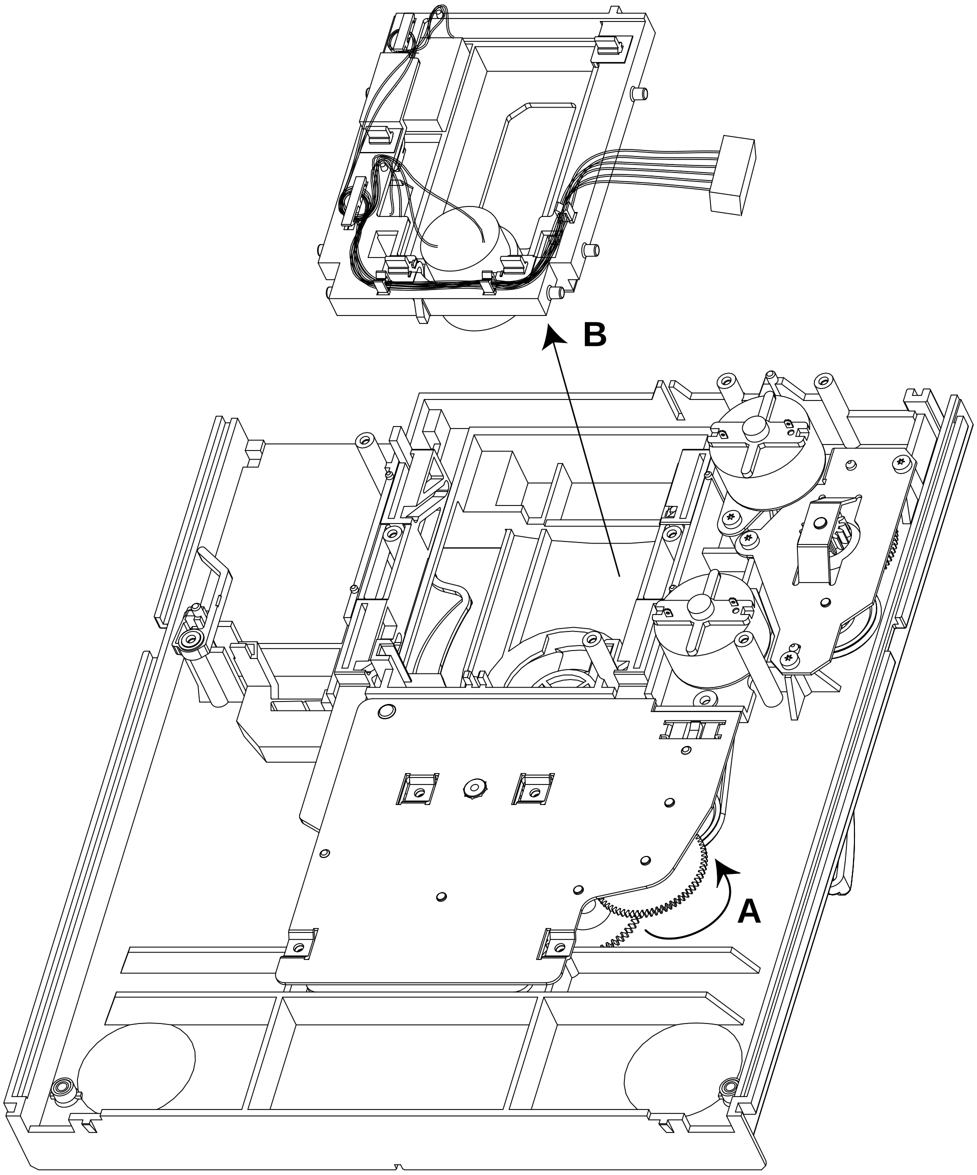
→ **D** Lift plate to unlock pin from bottom plate
→ **E** Move plate inwards to demount from bottom plate

Servicing Hints

Replacement of CD Drive

See also exploded view of changer mechanism.

1. Dismantle printed circuit board: remove 5 screws.
2. Disconnect flexfoil cable and JST connector.
   Pay attention to WARNING!
3. Loosen 2 screws (pos 107,108) and remove CD drive-lockings (pos 105,106).
4. Turn gearwheel (pos 42) of disc change mechanism by finger to move CD drive support in upper position as shown in picture below Ⓐ.
5. Dismantle CD drive support (pos 95) Ⓑ.
6. Replace CD drive (pos 100). The wire tree of JST connector has to be desoldered and resoldered on the new CD drive again.

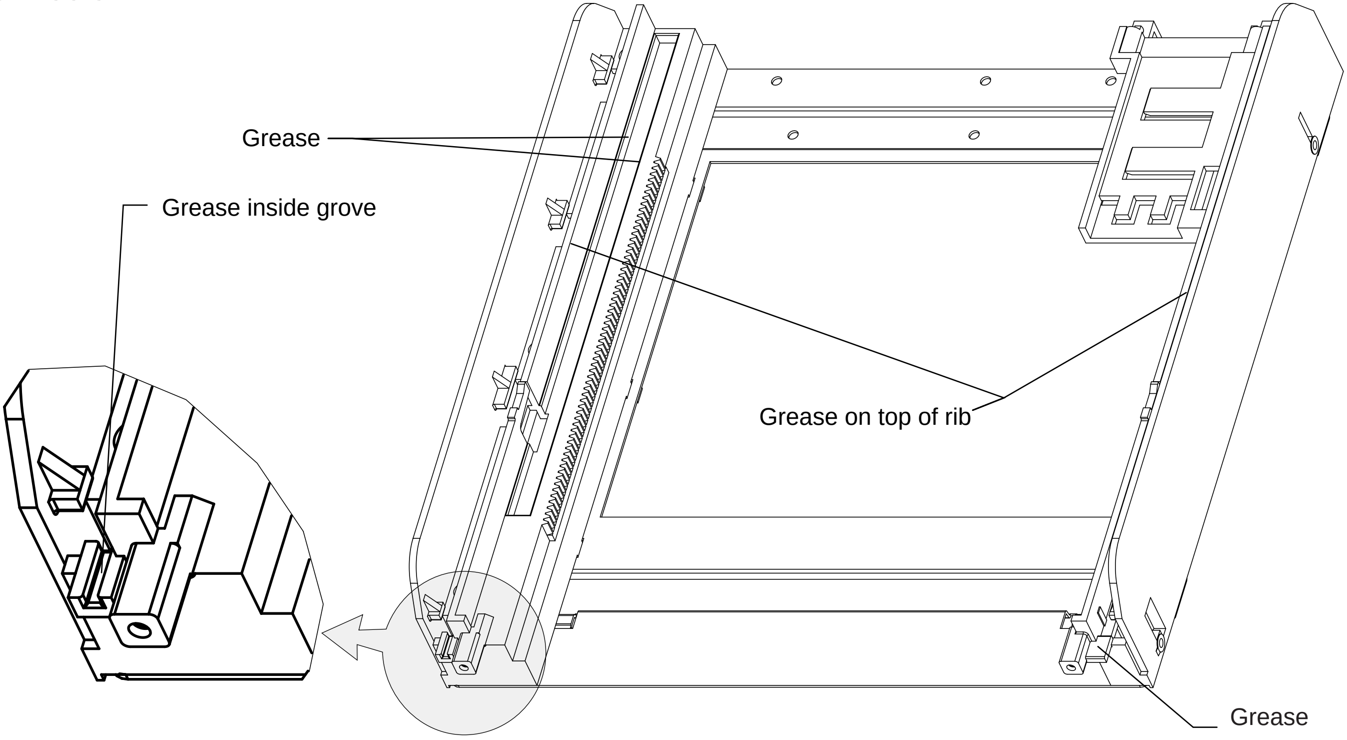


Mounting of Carousel

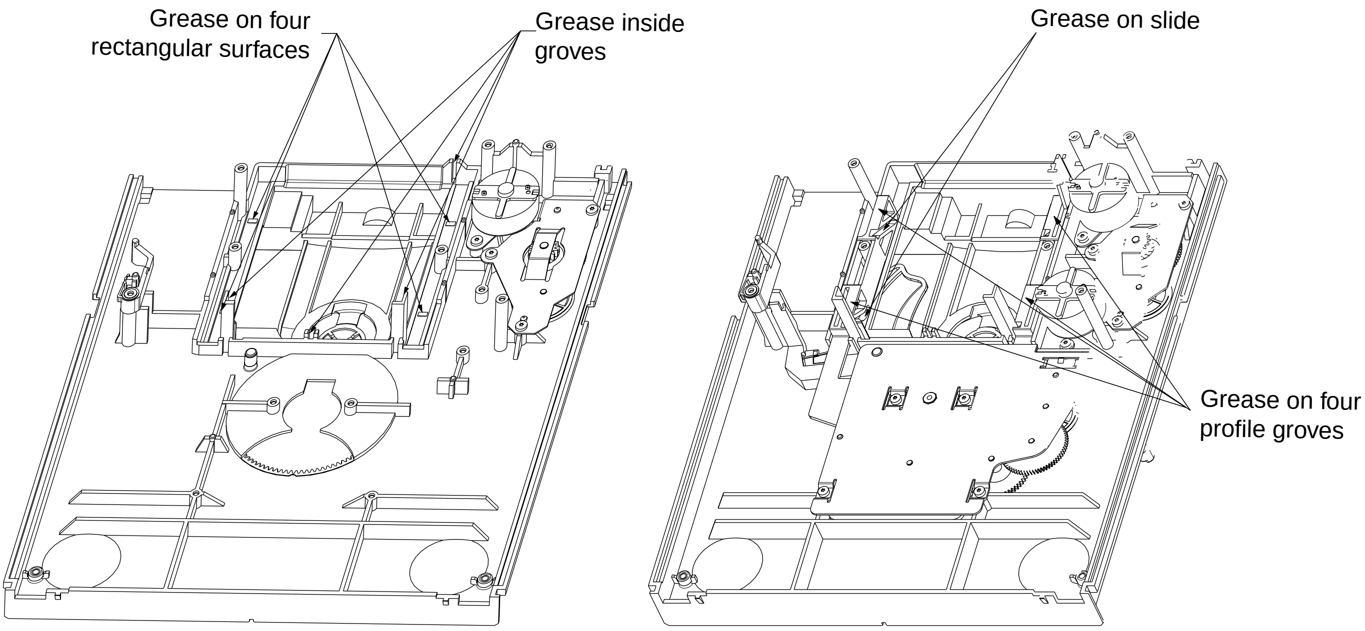
1. Turn gearwheel (pos 42) of disc change mechanism by finger until CD drive is in play position.
2. Mount carousel (pos 115) so that disc is positioned right on turntable. Carousel position number doesn´t matter.

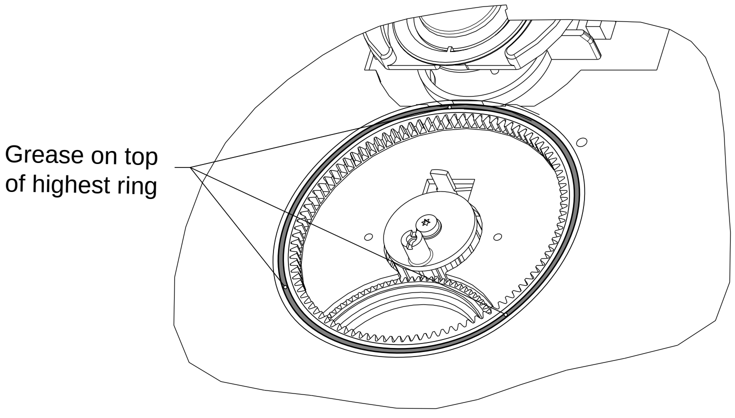
Lubrication Instructions

CHASSIS

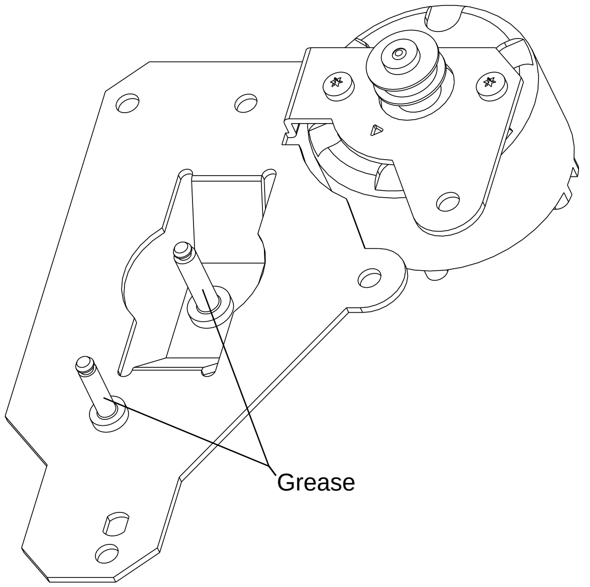

Grease
Grease inside grove
Grease on top of rib
Grease

DRAWER

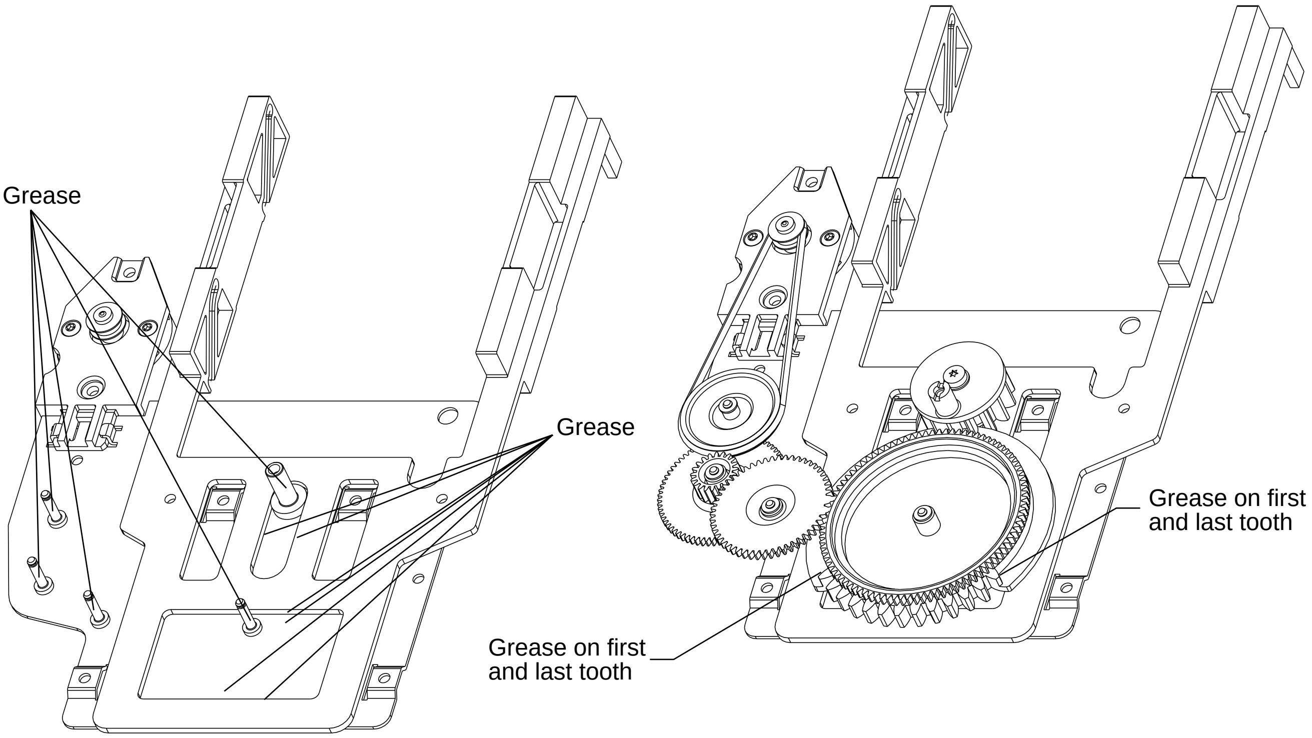

Grease on four rectangular surfaces
Grease inside groves
Grease on slide
Grease on four profile groves


Grease on top of highest ring

DRAWER MECHANISM



DISC CHANGE MECHANISM


Grease
Grease
Grease on first and last tooth
Grease on first and last tooth

Use only grease **Polylub GLY 801** service codenumber 4822 390 10136

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CD MECHANISM. THAT´S WHY, BESIDES THE SAFETY MEASURES LIKE
- ***SWITCH OFF POWER SUPPLY***
- ***ESD PROTECTION***

ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the CD mechanism:

1. Disconnect flexfoil cable from old CD drive
2. Put a paper clip onto the flexfoil cable to short-circuit connections (fig.1)
3. Remove old CD drive
4. Remove paper clip from flexfoil cable
5. Connect flexfoil cable to new CD drive
6. Position new CD drive on its studs
7. Remove soldered short-circuit from Laserunit (see below)

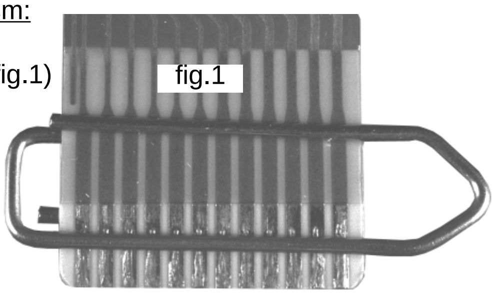
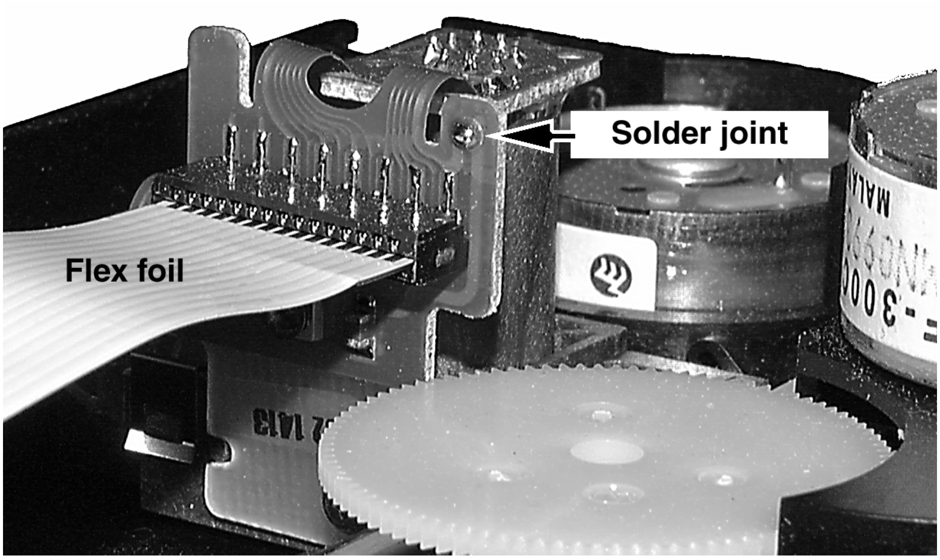
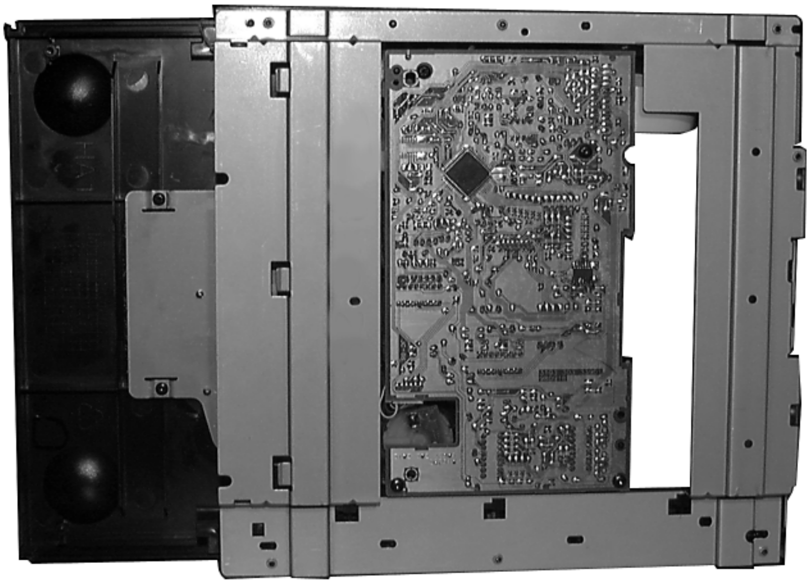


fig.1

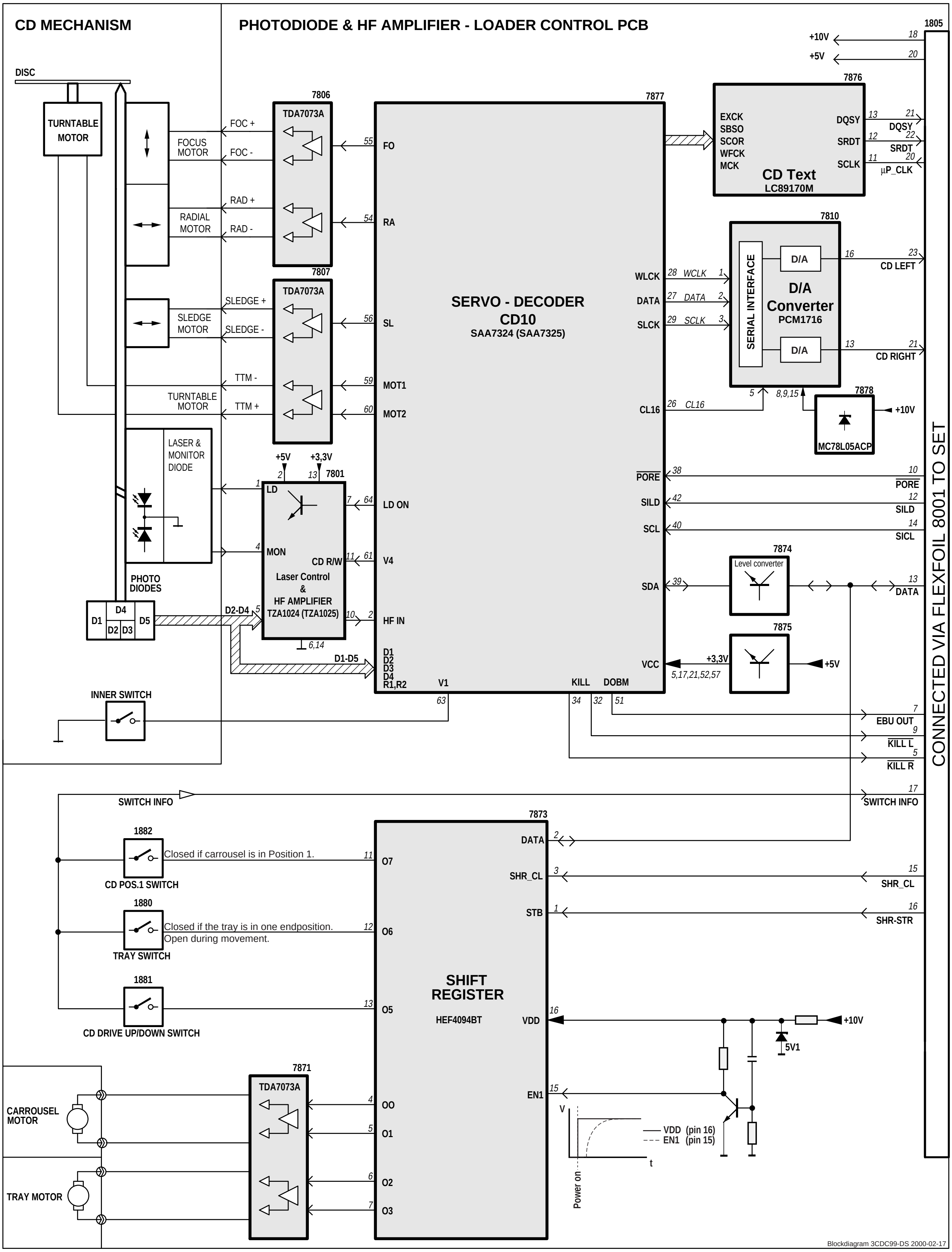
Attention: The laser diode of this CD drive is protected against ESD by a solder joint which shortcircuits the laser diode to ground.
For proper functionality of the CD drive this solder joint must be removed **after** connecting the drive to the set.



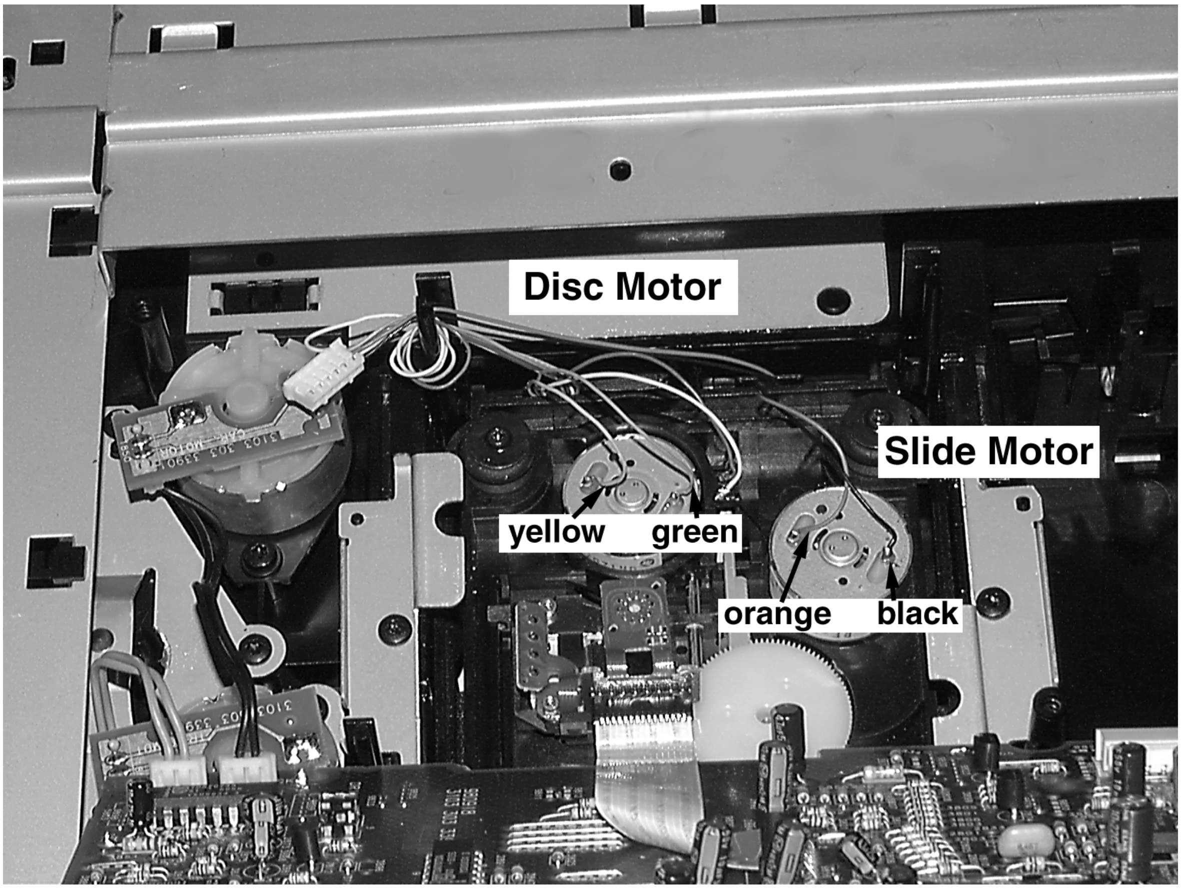
Service Position



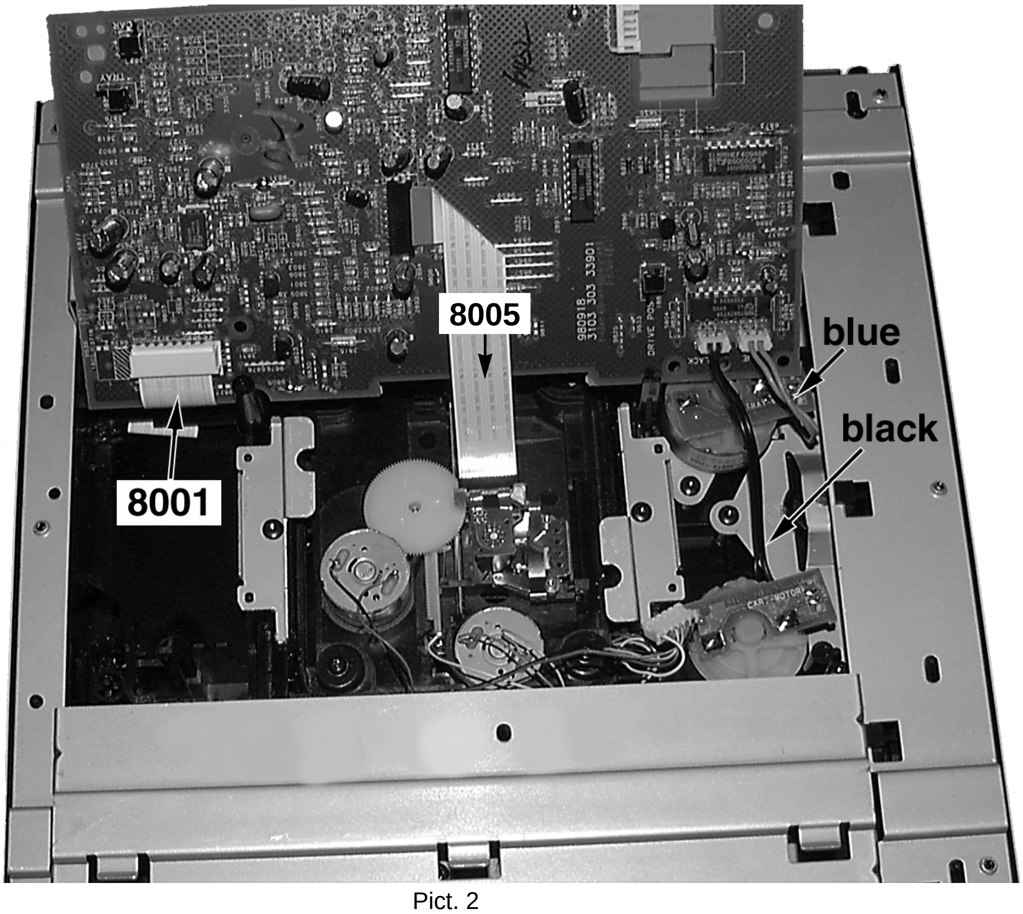
Blockdiagram


CD MECHANISM
PHOTODIODE & HF AMPLIFIER - LOADER CONTROL PCB
1805
+10V
18
+5V
20
DISC
TURNTABLE MOTOR
FOCUS MOTOR
FOC +
FOC -
RADIAL MOTOR
RAD +
RAD -
SLEDGE MOTOR
SLEDGE +
SLEDGE -
TURNTABLE MOTOR
TTM -
TTM +
LASER & MONITOR DIODE
PHOTO DIODES
D1
D2
D3
D4
D5
D2-D4
D1-D5
INNER SWITCH
7806
TDA7073A
7807
TDA7073A
55
54
56
59
60
7877
FO
RA
SL
MOT1
MOT2
SERVO - DECODER
CD10
SAA7324 (SAA7325)
WLCK
DATA
SLCK
CL16
PORE
SILD
SCL
SDA
VCC
28 WCLK 1
27 DATA 2
29 SCLK 3
26 CL16
38
42
40
39
5,17,21,52,57
+3,3V
LD ON
V4
HF IN
D1
D2
D3
D4
R1,R2
V1
KILL
DOBM
63
34
32
51
+5V
+3,3V
2
13
7801
1
LD
4
MON
CD R/W
Laser Control & HF AMPLIFIER
TZA1024 (TZA1025)
7
64
11
61
10
2
5
6,14
7876
EXCK
SBSO
SCOR
WFCK
MCK
DQSY
SRDT
SCLK
CD Text
LC89170M
13
21
DQSY
12
22
SRDT
11
20
µP_CLK
7810
SERIAL INTERFACE
D/A
D/A Converter
PCM1716
D/A
16
23
CD LEFT
13
21
CD RIGHT
5
8,9,15
7878
MC78L05ACP
+10V
10
PORE
12
SILD
14
SICL
7874
Level converter
13
DATA
7875
+5V
7
EBU OUT
9
KILL L
5
KILL R
17
SWITCH INFO
CONNECTED VIA FLEXFOIL 8001 TO SET
SWITCH INFO
1882
Closed if carrousel is in Position 1.
CD POS.1 SWITCH
1880
Closed if the tray is in one endposition.
Open during movement.
TRAY SWITCH
1881
CD DRIVE UP/DOWN SWITCH
7873
11
O7
12
O6
13
O5
SHIFT REGISTER
HEF4094BT
DATA
2
SHR_CL
3
15
SHR_CL
STB
1
16
SHR-STR
VDD
16
+10V
5V1
EN1
15
V
t
Power on
VDD (pin 16)
EN1 (pin 15)
7871
TDA7073A
CARROUSEL MOTOR
TRAY MOTOR
4
OO
5
O1
6
O2
7
O3
Blockdiagram 3CDC99-DS 2000-02-17

Wiring of CD Drive

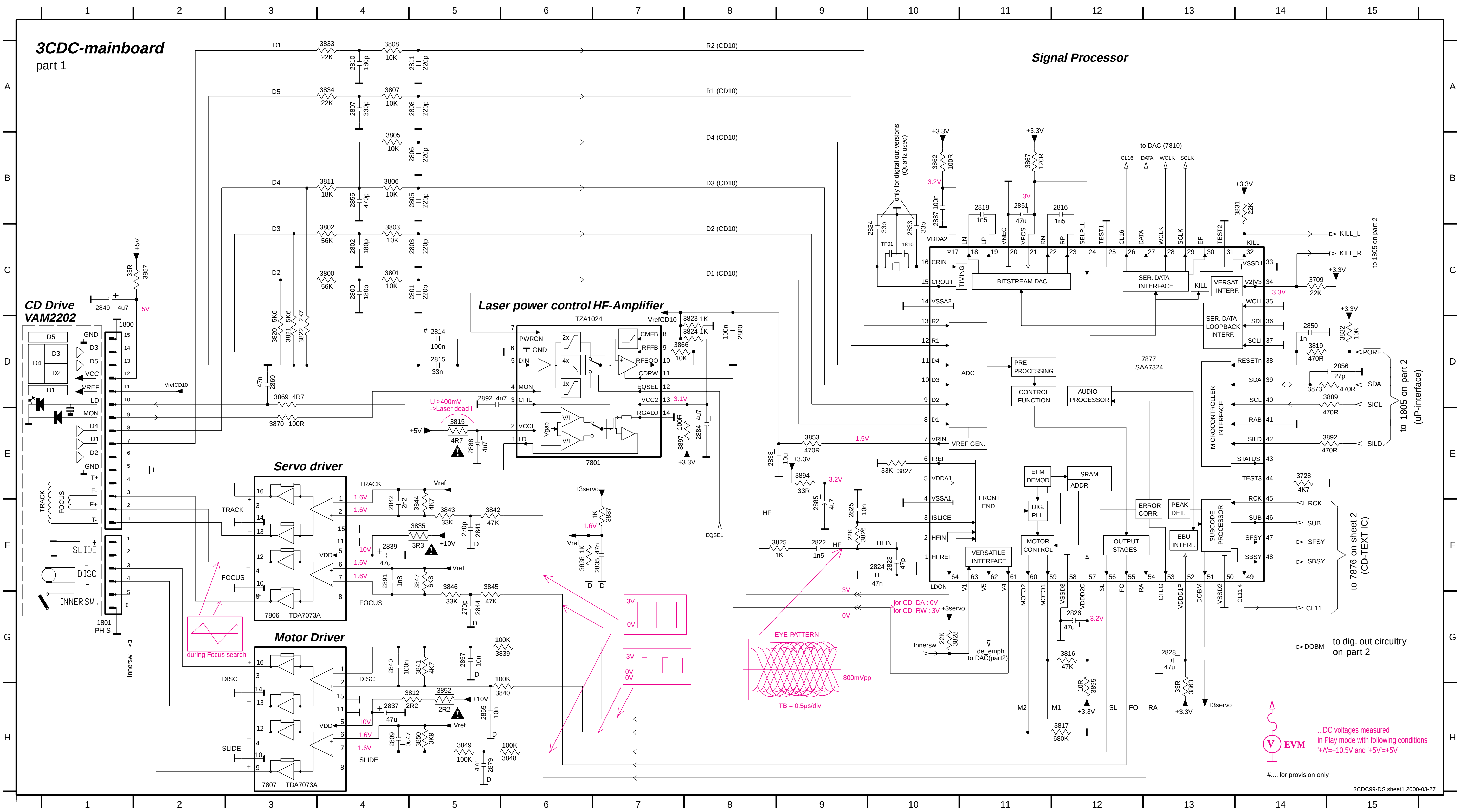

Disc Motor
Slide Motor
yellow
green
orange
black

Pict. 1

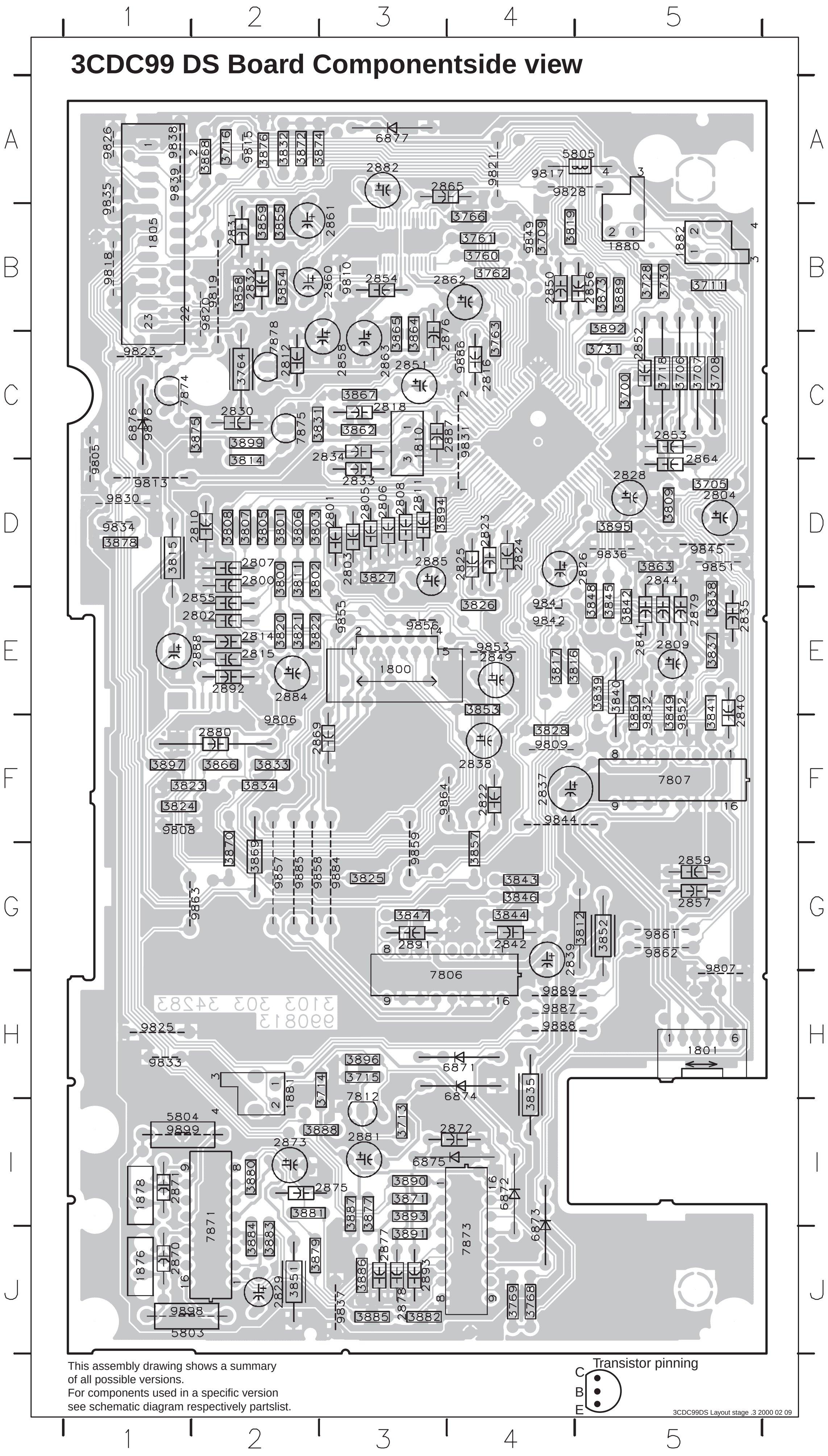

8005
blue
black
8001

Pict. 2

1800 D2	2803 C5	2810 A4	2822 F9	2833 C10	2840 G4	2851 B11	2879 H5	2891 F4	3802 C4	3811 B4	3820 D3	3826 F9	3834 A4	3841 G5	3847 F5	3857 C2	3870 E3	3897 E7
1801 G1	2805 B5	2811 A5	2823 F10	2834 C10	2841 F5	2855 B4	2880 D8	2892 D5	3803 C4	3812 H5	3821 D3	3827 E10	3835 F5	3842 F5	3848 H6	3862 B10	3873 D14	7801 E7
1810 C10	2806 B5	2814 D5	2824 F10	2835 F7	2842 F4	2856 D15	2884 E8	3709 C14	3805 B4	3815 E5	3822 D3	3828 G10	3837 F7	3843 F5	3849 H5	3863 H13	3889 D15	7806 G3
2800 C4	2807 A4	2815 D5	2825 F9	2837 H4	2844 G5	2857 G5	2885 F9	3728 E14	3806 B4	3816 G12	3823 D8	3831 B14	3838 F6	3844 F5	3850 H5	3866 D7	3892 E15	7807 H3
2801 C5	2808 A5	2816 B12	2826 G12	2838 E8	2849 C1	2859 H5	2887 B10	3800 C4	3807 A4	3817 H12	3824 D8	3832 D15	3839 G6	3845 F5	3852 H5	3867 B11	3894 E9	7877 D12
2802 C4	2809 H4	2818 B11	2828 G13	2839 F4	2850 D14	2869 D3	2888 E5	3801 C4	3808 A4	3819 D14	3825 F9	3833 A4	3840 H6	3846 F5	3853 E9	3869 D3	3895 H12	


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
3CDC-mainboard
part 1
CD Drive
VAM2202
Laser power control HF-Amplifier
TZA1024
Servo driver
Motor Driver
TDA7073A
Signal Processor
7877
SAA7324
ADC
PRE-PROCESSING
CONTROL FUNCTION
AUDIO PROCESSOR
BITSTREAM DAC
SER. DATA INTERFACE
KILL
VERSAT. INTERF.
SER. DATA LOOPBACK INTERF.
MICROCONTROLLER INTERFACE
SUBCODE PROCESSOR
FRONT END
EFM DEMOD
SRAM
ADDR
DIG. PLL
MOTOR CONTROL
ERROR CORR.
PEAK DET.
EBU INTERF.
OUTPUT STAGES
VERSATILE INTERFACE
VREF GEN.
TIMING
to DAC (7810)
to 1805 on part 2
to 1805 (uP-interface)
to 7876 on sheet 2 (CD-TEXT IC)
to dig. out circuitry on part 2
only for digital out versions (Quartz used)
U >400mV ->Laser dead !
during Focus search
EYE-PATTERN
800mVpp
TB = 0.5µs/div
for CD_DA : 0V
for CD_RW : 3V
...DC voltages measured in Play mode with following conditions '+A'=+10.5V and '+5V'=+5V
EVM
#.... for provision only
3CDC99-DS sheet1 2000-03-27

3CDC99 DS Board Componentside view

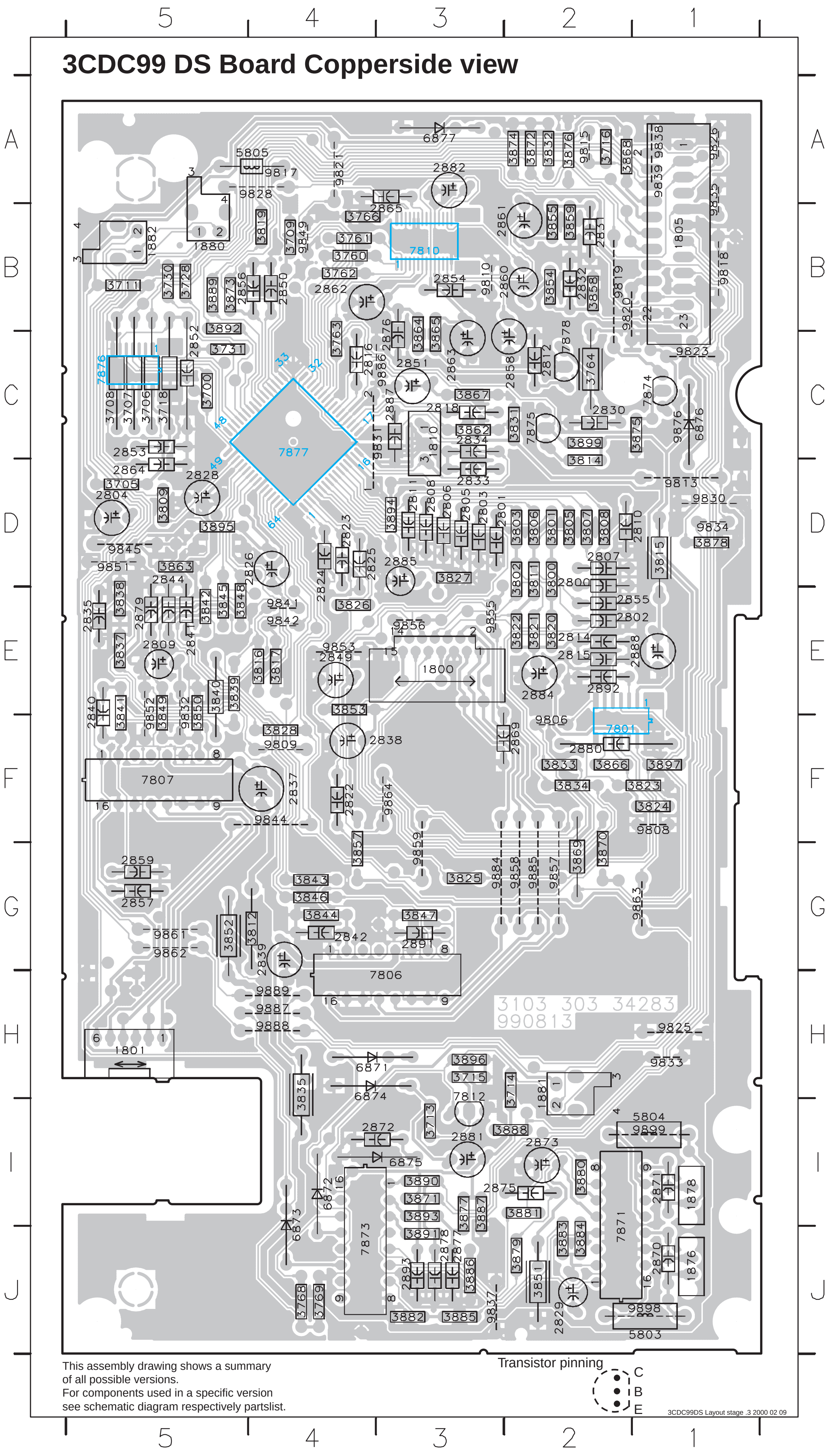

1
2
3
4
5
A
B
C
D
E
F
G
H
I
J
1800
1801
7806
7807
7871
7873
3103 303 34283
990813
Transistor pinning
C
B
E
3CDC99DS Layout stage .3 2000 02 09

This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

Mapping

1800	E3
1801	H5
1805	A1
1810	D3
1876	J1
1878	I1
1880	A5
1881	I2
1882	B5
2800	D2
2801	D3
2802	E2
2803	D3
2804	D5
2805	D3
2806	D3
2807	D2
2808	D3
2809	E5
2810	D2
2811	D3
2812	C2
2814	E2
2815	E1
2816	C4
2818	C3
2822	F4
2823	D4
2824	D4
2825	D4
2826	D4
2828	D5
2829	J2
2830	C2
2831	B2
2832	B2
2833	D2
2834	C2
2835	E5
2837	F4
2838	F4
2839	H4
2840	E5
2841	E5
2842	G4
2844	E5
2849	E4
2850	B4
2851	C3
2852	C5
2853	C5
2854	B3
2855	E2
2856	C4
2857	G5
2858	C3
2859	G5
2860	B3
2861	A2
2862	B4
2863	C3
2864	D5
2865	A3
2869	F2
2870	J1
2871	I1
2872	I4
2873	I2
2875	I3
2876	B3
2877	J3
2878	J3
2879	E5
2880	F2
2881	I3
2882	A3
2884	E2
2885	E3
2887	C4
2888	E1
2891	G3
2892	E2
2893	J3
3700	C5
3705	D5
3706	C5
3707	C5
3708	C5
3709	B4
3711	B5
3713	I3
3714	H2
3715	H3
3716	A2
3718	C5
3728	B5
3730	B5
3731	C5
3760	B3
3761	B3
3762	B3
3763	C4
3764	C2
3766	B3
3768	J4
3769	J4
3800	D2
3801	D2
3802	D3
3803	D2
3805	D2
3806	D2
3807	D2
3808	D2
3809	D5
3811	D2
3812	G4
3814	D2
3815	D1
3816	E5
3817	E4
3819	B5
3820	E2
3821	E2
3822	E3
3823	F1
3824	F1
3825	G3
3826	E4
3827	E3
3828	F4
3831	C2
3832	A2
3833	F2
3834	F2
3835	H4
3837	E5
3838	D5
3839	E5
3840	E5
3841	E5
3842	E5
3843	G4
3844	G4
3845	E5
3846	G4
3847	G3
3848	E5
3849	E5
3850	E5
3851	J2
3852	G5
3853	F4
3854	B2
3855	B2
3857	G4
3858	B2
3859	A2
3862	C3
3863	D5
3864	B3
3865	C3
3866	F2
3867	C3
3868	B2
3869	G2
3870	G2
3871	I3
3872	A2
3873	B5
3874	A3
3875	C1
3876	A2
3877	I3
3878	D1
3879	J3
3880	I2
3881	I2
3882	J3
3883	J2
3884	I2
3885	J3
3886	J3
3887	I3
3888	I3
3889	B5
3890	I3
3891	I3
3892	C4
3893	I3
3894	D4
3895	D5
3896	H3
3897	F1
3899	C2
5803	J1
5804	I1
5805	A5
6871	H4
6872	I4
6873	I4
6874	H4
6875	I4
6876	C1
6877	A3
7801	F2
7806	H3
7807	F5
7810	B3
7812	H3
7871	I1
7873	J4
7874	C1
7875	C2
7876	C5
7877	C4
7878	C2
9805	C1
9806	E2
9807	G5
9808	F1
9809	F4
9810	B3
9813	D1
9815	A2
9817	A5
9818	B1
9819	B2
9820	B2
9821	A4
9823	C1
9825	H1
9826	A1
9828	A5
9830	D1
9831	C4
9832	E5
9833	H1
9834	D1
9835	A1
9836	D5
9837	J3
9838	A1
9839	A1
9841	E4
9842	E4
9844	F4
9845	D5
9849	A4
9851	D5
9852	E5
9853	E4
9855	E3
9856	E3
9857	G2
9858	G3
9859	G3
9861	G5
9862	G5
9863	G2
9864	F3
9876	C1
9884	G3
9885	G2
9886	C3
9887	H4
9888	H4
9889	H4
9898	J1
9899	I1

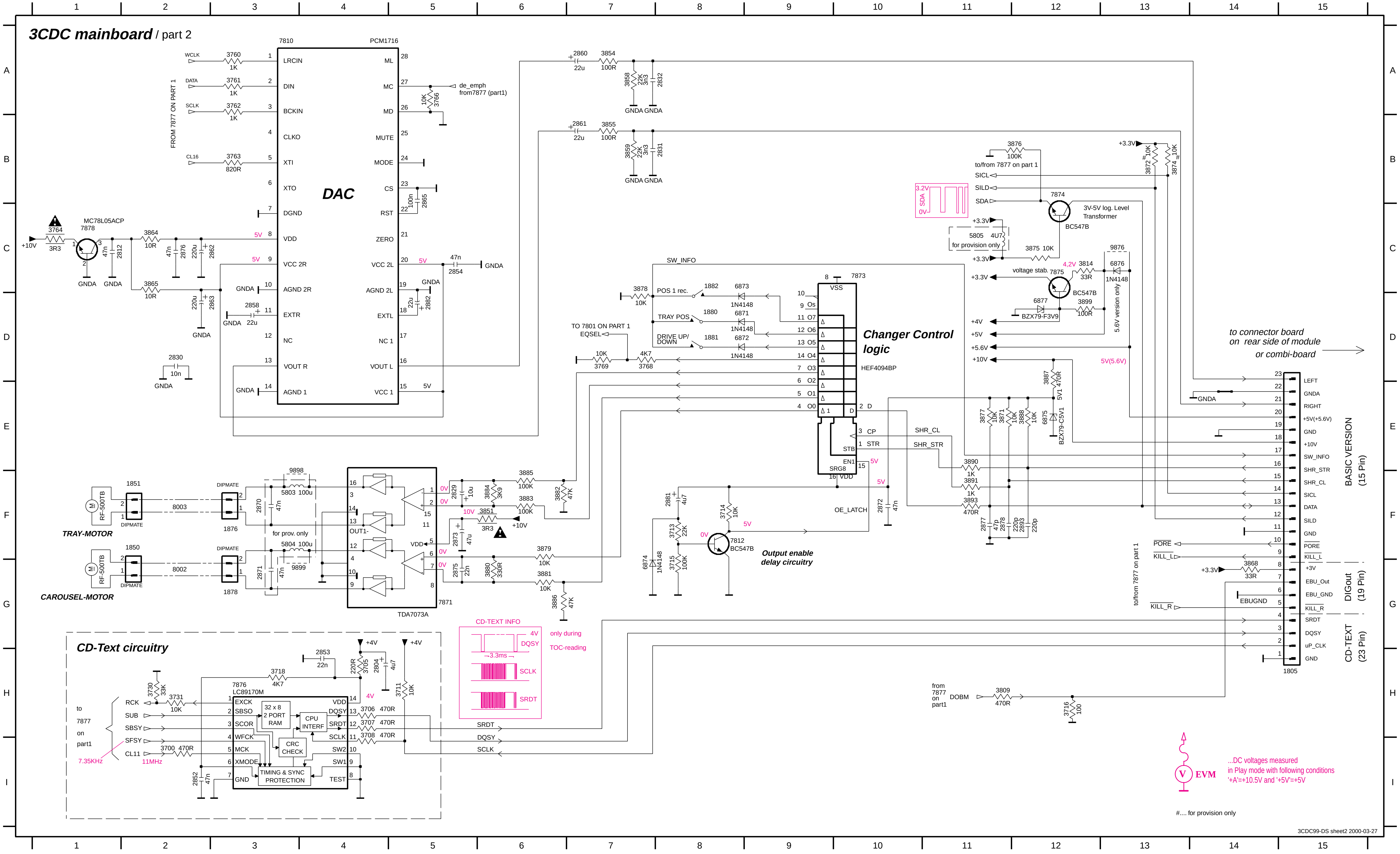
3CDC99 DS Board Copperside view


5
4
3
2
1
A
B
C
D
E
F
G
H
I
J
7801
7810
7876
7877
1800
1801
7806
7807
7871
7873
3103 303 34283
990813
Transistor pinning
C
B
E
3CDC99DS Layout stage .3 2000 02 09

This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

1805 H15	2804 H4	2852 I2	2862 C2	2872 F10	2881 F8	3707 H4	3716 H12	3762 A3	3809 H11	3859 B7	3874 B13	3880 G6	3886 G6	3896 G10	6872 D8	7810 A3	7876 H3	9839 C14
1876 F3	2812 C1	2853 H4	2863 D2	2873 F5	2882 D5	3708 H4	3718 H3	3763 B3	3814 C12	3864 C2	3875 C12	3881 G6	3887 D12	3899 D12	6873 C8	7812 F8	7878 C1	9876 C13
1878 G3	2829 F5	2854 C5	2864 H12	2875 G5	2893 F12	3711 H5	3730 H2	3764 C1	3851 F6	3865 C2	3876 B12	3882 F6	3888 E12	5803 F3	6874 G7	7871 G5	9826 H14	9898 E3
1880 D8	2830 D2	2858 D3	2865 B5	2876 C2	3700 I2	3713 F8	3731 H2	3766 A5	3854 A7	3868 G14	3877 E11	3883 F6	3890 E11	5804 F3	6875 E12	7873 C10	9834 F10	9899 G3
1881 D8	2831 B8	2860 A7	2870 F3	2877 F11	3705 H4	3714 F8	3760 A3	3768 D7	3855 B7	3871 E11	3878 C7	3884 F6	3891 F11	5805 C11	6876 C13	7874 B12	9835 G11	
1882 C8	2832 A8	2861 B7	2871 G3	2878 F11	3706 H4	3715 G8	3761 A3	3769 D7	3858 A7	3872 B13	3879 F6	3885 E6	3893 F11	6871 D8	6877 D12	7875 C12	9838 C14	

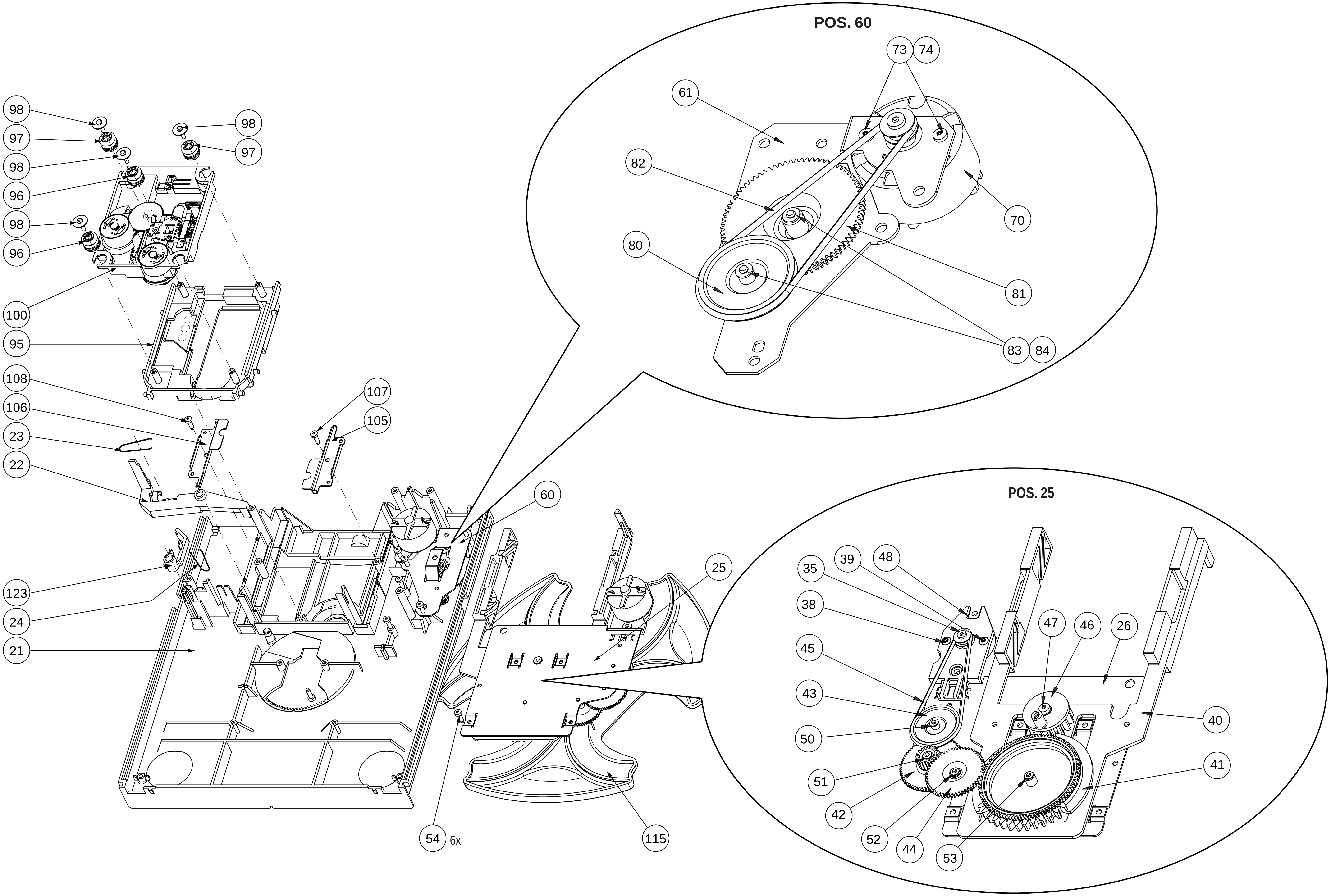
3CDC mainboard / part 2

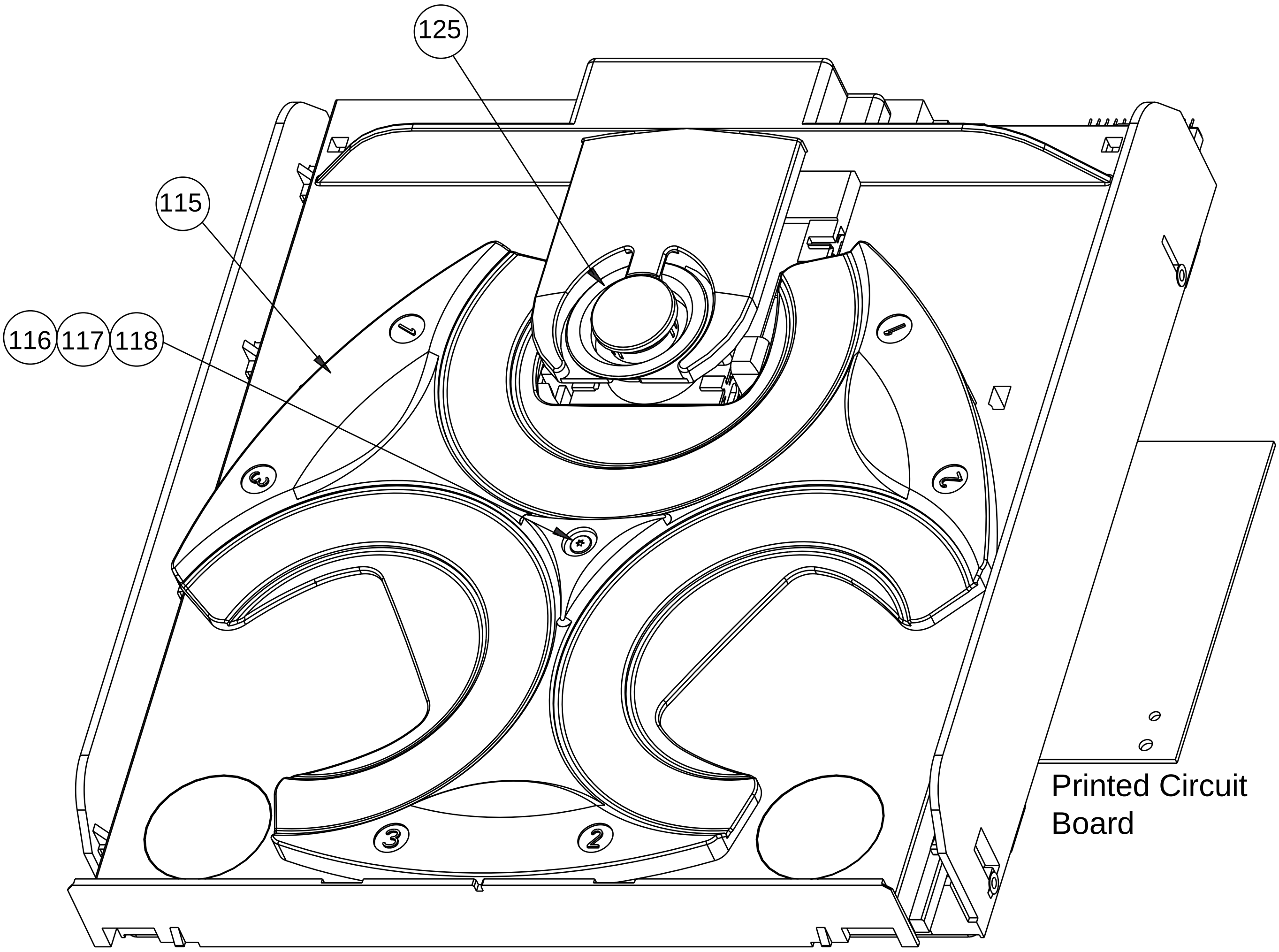


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H I
7810 PCM1716
DAC
LRCIN
DIN
BCKIN
CLKO
XTI
XTO
DGND
VDD
VCC 2R
AGND 2R
EXTR
NC
VOUT R
AGND 1
ML
MC
MD
MUTE
MODE
CS
RST
ZERO
VCC 2L
AGND 2L
EXTL
NC 1
VOUT L
VCC 1
WCLK
DATA
SCLK
CL16
FROM 7877 ON PART 1
de_emph from7877 (part1)
MC78L05ACP 7878
+10V
GNDA
5V
7873
VSS
VDD
HEF4094BP
Changer Control logic
SW_INFO
POS 1 rec.
TRAY POS
DRIVE UP/ DOWN
TO 7801 ON PART 1 EQSEL
CP
STR
STB
EN1
SRG8
OE_LATCH
SHR_CL
SHR_STR
Output enable delay circuitry
7812 BC547B
to/from 7877 on part 1
SICL
SILD
SDA
3.2V
0V
7874
3V-5V log. Level Transformer
BC547B
for provision only
voltage stab. 7875
BZX79-F3V9
BZX79-C5V1
5.6V version only
5V(5.6V)
+3.3V
+4V
+5V
+5.6V
to connector board on rear side of module or combi-board
LEFT
GNDA
RIGHT
+5V(+5.6V)
GND
+10V
SW_INFO
SHR_STR
SHR_CL
SICL
DATA
SILD
GND
PORE
KILL_L
+3V
EBU_Out
EBU_GND
KILL_R
SRDT
DQSY
uP_CLK
GND
BASIC VERSION (15 Pin)
DIGout (19 Pin)
CD-TEXT (23 Pin)
1805
EBUGND
to/from 7877 on part 1
1851
RF-500TB
DIPMATE
8003
1876
TRAY-MOTOR
1850
8002
1878
CAROUSEL-MOTOR
for prov. only
TDA7073A
7871
OUT1-
VDD
CD-Text circuitry
7876 LC89170M
EXCK
SBSO
SCOR
WFCK
MCK
XMODE
GND
32 x 8 2 PORT RAM
CPU INTERF
CRC CHECK
TIMING & SYNC PROTECTION
VDD
DQSY
SRDT
SCLK
SW2
SW1
TEST
to 7877 on part1
RCK
SUB
SBSY
SFSY
CL11
7.35KHz
11MHz
CD-TEXT INFO
DQSY
SCLK
SRDT
4V
←3.3ms→
only during TOC-reading
from 7877 on part1
DOBM
EVM
3CDC99-DS sheet2 2000-03-27

...DC voltages measured in Play mode with following conditions '+A'=+10.5V and '+5V'=+5V

#.... for provision only

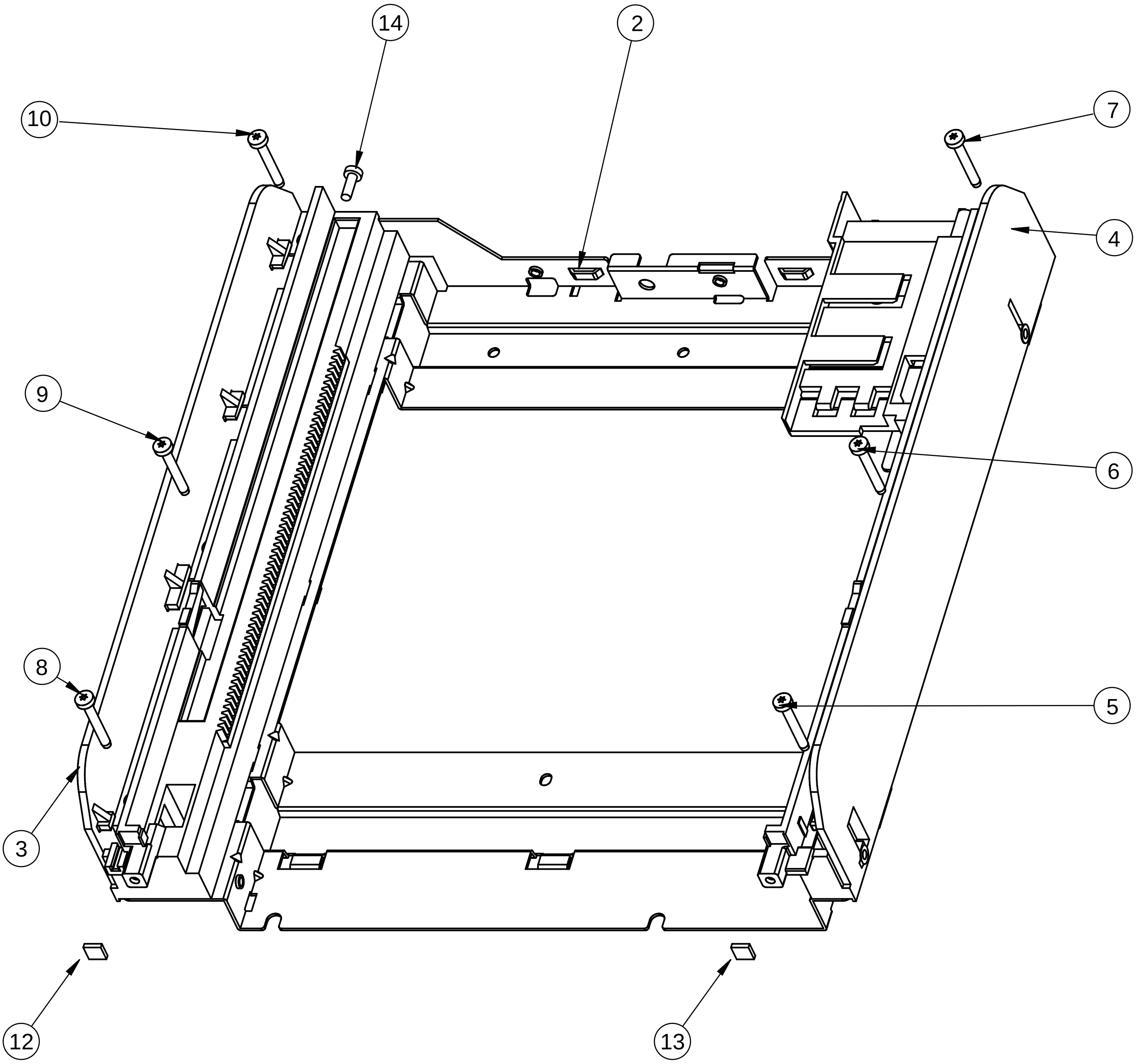

POS. 60
6x
POS. 25



MECHANICAL PARTSLIST 3CDC-99 MODULE

0003	4822 463 11235	GUIDING LEFT
0004	4822 463 11236	GUIDING RIGHT
0012	4822 466 12146	RUBBER
0013	4822 466 12146	RUBBER
0021	4822 418 10403	DRAWER
0022	4822 402 11236	BRACKET TUMBLER
0023	4822 492 11721	SPRING
0024	4822 492 11721	SPRING
0038	4822 502 12548	SCREW M2,6x3,5
0039	4822 502 12548	SCREW M2,6X3,5
0040	4822 463 11237	SLIDE
0041	4822 522 10509	CONTROL DISC
0042	4822 522 10492	GEAR WHEEL
0043	4822 528 10937	PULLEY
0044	4822 522 10493	IDLER WHEEL
0045	4822 358 10115	BELT
0046	4822 466 10735	ECCENTRIC GEAR WHEEL
0050	4822 532 12364	WASHER
0051	4822 532 12364	WASHER
0052	4822 532 12364	WASHER

continued on next page



MECHANICAL PARTSLIST 3CDC-99 MODULE

0053	4822 532 12364	WASHER
0073	4822 502 12548	SCREW M2,6X3,5
0074	4822 502 12548	SCREW M2,6X3,5
0080	4822 528 10937	PULLEY
0081	4822 522 10494	GEAR DRAWER
0082	4822 358 10115	BELT
0083	4822 532 12364	WASHER
0084	4822 532 12364	WASHER
0095	4822 404 10985	SUPPORT-VAM
0096	4822 529 10387	RUBBER DAMPER CD DRIVE, FRONT
0097	4822 529 10387	RUBBER DAMPER CD DRIVE, FRONT
0100	9305 022 30201	VAM2202/01
0115	4822 466 10736	CAROUSEL
0117	4822 532 12365	BUSH DRAWER
0123	4822 402 11237	SWITCH-BRACKET
0125	4822 401 11708	DISC CLAMP VAM DRIVE 3CDC

ELECTRICAL PARTSLIST 3CDC-99 MODULE

MISCELLANEOUS

0035	4822 361 10753	CAROUSEL MOTOR
0070	4822 361 10753	TRAY MOTOR
1800	4822 265 10925	FFC SOCKET, 15P
1805	4822 265 11533	FFC SOCKET, 23P
1880	4822 276 13503	SWITCH
1881	4822 276 13503	SWITCH
1882	4822 276 13503	SWITCH
8001	3103 308 92020	FLEX FOIL CABLE 23P, 420mm
8005	3103 308 91820	FLEX FOIL CABLE 15P, 95mm

CAPACITORS

2800	4822 126 10053	180pF	10%	50V
2801	4822 122 10466	220pF	10%	50V
2802	4822 126 10053	180pF	10%	50V
2803	4822 122 10466	220pF	10%	50V
2804	4822 124 40769	4,7µF	20%	100V
2805	4822 122 10466	220pF	10%	50V
2806	4822 122 10466	220pF	10%	50V
2807	4822 126 12787	330pF	10%	50V
2808	4822 122 10466	220pF	10%	50V
2809	5322 124 41948	0,47µF	20%	50V
2810	4822 126 10053	180pF	10%	50V
2811	4822 122 10466	220pF	10%	50V
2812	4822 126 12785	47nF	20%	50V
2815	4822 126 13174	33nF	20%	16V
2816	4822 126 12878	1,5nF	10%	16V
2818	4822 126 12878	1,5nF	10%	16V
2822	4822 126 12878	1,5nF	10%	16V
2823	4822 122 33848	47pF	5%	50V
2824	4822 126 12785	47nF	20%	50V
2825	4822 121 51387	10nF	20%	16V
2826	4822 124 80231	47µF	20%	16V
2828	4822 124 40433	47µF	20%	25V
2829	4822 124 21732	10µF	20%	25V
2830	4822 121 51387	10nF	20%	16V
2831	4822 122 10577	3,3nF	10%	16V
2832	4822 122 10577	3,3nF	10%	16V
2833	4822 122 33069	33pF	5%	50V
2834	4822 122 33069	33pF	5%	50V
2835	4822 126 12785	47nF	20%	50V
2837	4822 124 40433	47µF	20%	25V
2838	4822 124 40248	10µF	20%	63V
2839	4822 124 40433	47µF	20%	25V
2840	4822 126 12882	100nF	20%	50V
2841	4822 126 12702	270pF	10%	50V
2842	4822 126 12339	2,2nF	10%	16V
2844	4822 126 12702	270pF	10%	50V
2849	4822 124 40769	4,7µF	20%	100V
2850	4822 122 33197	1nF	10%	50V
2851	4822 124 40433	47µF	20%	25V
2852	4822 126 12785	47nF	20%	50V
2853	4822 126 11585	22nF	20%	50V
2854	4822 126 12785	47nF	20%	50V
2855	4822 122 33519	470pF	10%	50V
2856	4822 122 33848	47pF	5%	50V
2857	4822 121 51387	10nF	20%	16V
2858	4822 124 81151	22µF	20%	50V
2859	4822 121 51387	10nF	20%	16V
2860	4822 124 41596	22µF	20%	50V
2861	4822 124 41596	22µF	20%	50V
2862	4822 124 11912	220µF	20%	6,3V

CAPACITORS

2863	4822 124 11912	220µF	20%	6,3V
2865	4822 126 12882	100nF	20%	50V
2869	4822 126 12785	47nF	20%	50V
2872	4822 126 12785	47nF	20%	50V
2873	4822 124 12233	47µF	20%	25V
2875	4822 126 11585	22nF	20%	50V
2876	4822 126 12785	47nF	20%	50V
2877	4822 122 33848	47pF	5%	50V
2878	4822 122 10466	220pF	10%	50V
2879	4822 126 12785	47nF	20%	50V
2880	4822 126 12882	100nF	20%	50V
2881	4822 124 40769	4,7µF	20%	100V
2882	4822 124 81151	22µF	20%	50V
2884	4822 124 40769	4,7µF	20%	100V
2885	4822 124 40769	4,7µF	20%	100V
2887	4822 126 12882	100nF	20%	50V
2888	4822 124 40769	4,7µF	20%	100V
2891	4822 122 10576	1,8nF	10%	16V
2892	4822 126 11714	4,7nF	20%	16V
2893	4822 122 10466	220pF	10%	50V

RESISTORS

3700	4822 116 83883	470Ω	5%	0,16W
3705	4822 116 83872	220Ω	5%	0,5W
3706	4822 116 83883	470Ω	5%	0,16W
3707	4822 116 83883	470Ω	5%	0,16W
3708	4822 116 83883	470Ω	5%	0,16W
3709	4822 116 52257	22kΩ	5%	0,5W
3711	4822 050 21003	10kΩ	2%	0,25W
3713	4822 116 52257	22kΩ	5%	0,5W
3714	4822 050 21003	10kΩ	2%	0,25W
3715	4822 116 52234	100kΩ	5%	0,5W
3716	4822 116 52175	100Ω	5%	0,5W
3718	4822 116 52283	4,7kΩ	5%	0,5W
3728	4822 116 52283	4,7kΩ	5%	0,5W
3730	4822 050 23303	33kΩ	1%	0,6W
3731	4822 050 21003	10kΩ	2%	0,25W
3760	4822 050 11002	1kΩ	5%	0,2W
3761	4822 050 11002	1kΩ	5%	0,2W
3762	4822 050 11002	1kΩ	5%	0,2W
3763	4822 116 52231	820Ω	5%	0,5W
3764	4822 052 10338	3,3Ω		NFR25
3766	4822 050 21003	10kΩ	2%	0,25W
3768	4822 116 52283	4,7kΩ	5%	0,5W
3769	4822 050 21003	10kΩ	2%	0,25W
3800	4822 116 52291	56kΩ	5%	0,5W
3801	4822 050 21003	10kΩ	2%	0,25W
3802	4822 116 52291	56kΩ	5%	0,5W
3803	4822 050 21003	10kΩ	2%	0,25W
3805	4822 050 21003	10kΩ	2%	0,25W
3806	4822 050 21003	10kΩ	2%	0,25W
3807	4822 050 21003	10kΩ	2%	0,25W
3808	4822 050 21003	10kΩ	2%	0,25W
3809	4822 116 83883	470Ω	5%	0,16W
3811	4822 116 52251	18kΩ	5%	0,5W
3812	4822 053 10228	2,2Ω	5%	1W
3814	4822 116 52191	33Ω	5%	0,5W
3815	4822 052 10478	4,7Ω	5%	NFR
3816	4822 116 83884	47kΩ	5%	0,16W
3817	4822 116 52298	680kΩ	5%	0,5W
3819	4822 116 83883	470Ω	5%	0,16W
3820	4822 116 52289	5,6kΩ	5%	0,16W

ELECTRICAL PARTSLIST 3CDC-99 MODULE

RESISTORS

3821	4822 116 52289	5,6kΩ	5%	0,16W
3822	4822 116 52263	2,7kΩ	5%	0,5W
3823	4822 050 11002	1kΩ	5%	0,2W
3824	4822 050 11002	1kΩ	5%	0,2W
3825	4822 050 11002	1kΩ	5%	0,2W
3826	4822 116 52257	22kΩ	5%	0,5W
3827	4822 050 23303	33kΩ	1%	0,6W
3828	4822 116 52257	22kΩ	5%	0,5W
3831	4822 116 52257	22kΩ	5%	0,5W
3832	4822 050 21003	10kΩ	2%	0,25W
3833	4822 116 52257	22kΩ	5%	0,5W
3834	4822 116 52257	22kΩ	5%	0,5W
3835	4822 052 10338	3,3Ω		NFR25
3837	4822 050 11002	1kΩ	5%	0,2W
3838	4822 050 11002	1kΩ	5%	0,2W
3839	4822 116 52234	100kΩ	5%	0,5W
3840	4822 116 52234	100kΩ	5%	0,5W
3841	4822 116 52283	4,7kΩ	5%	0,5W
3842	4822 116 83884	47kΩ	5%	0,16W
3843	4822 050 23303	33kΩ	1%	0,6W
3844	4822 116 52283	4,7kΩ	5%	0,5W
3845	4822 116 83884	47kΩ	5%	0,16W
3846	4822 050 23303	33kΩ	1%	0,6W
3847	4822 116 83961	6,8kΩ	5%	0,16W
3848	4822 116 52234	100kΩ	5%	0,5W
3849	4822 116 52234	100kΩ	5%	0,5W
3850	4822 116 52276	3,9kΩ	5%	0,5W
3851	4822 052 10338	3,3Ω		NFR25
3852	4822 052 10228	2,2Ω	5%	0,33W
3853	4822 116 83883	470Ω	5%	0,16W
3854	4822 116 52175	100Ω	5%	0,5W
3855	4822 116 52175	100Ω	5%	0,5W
3857	4822 116 52191	33Ω	5%	0,5W
3858	4822 116 52257	22kΩ	5%	0,5W
3859	4822 116 52257	22kΩ	5%	0,5W
3862	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52191	33Ω	5%	0,5W
3864	4822 116 52176	10Ω	5%	0,5W
3865	4822 116 52176	10Ω	5%	0,5W
3866	4822 050 21003	10kΩ	2%	0,25W
3867	4822 116 52206	120Ω	5%	0,5W
3869	4822 050 24708	4,7Ω	1%	0,6W
3870	4822 116 52175	100Ω	5%	0,5W
3871	4822 050 21003	10kΩ	2%	0,25W
3872	4822 050 21003	10kΩ	2%	0,25W
3873	4822 116 83883	470Ω	5%	0,16W
3874	4822 050 21003	10kΩ	2%	0,25W
3875	4822 050 21003	10kΩ	2%	0,25W
3876	4822 116 52234	100kΩ	5%	0,5W
3877	4822 050 21003	10kΩ	2%	0,25W
3878	4822 050 21003	10kΩ	2%	0,25W
3879	4822 050 21003	10kΩ	2%	0,25W
3880	4822 116 52219	330Ω	5%	0,5W
3881	4822 050 21003	10kΩ	2%	0,25W
3882	4822 116 83884	47kΩ	5%	0,16W
3883	4822 116 52234	100kΩ	5%	0,5W
3884	4822 116 52276	3,9kΩ	5%	0,5W
3885	4822 116 52234	100kΩ	5%	0,5W
3886	4822 116 83884	47kΩ	5%	0,16W
3887	4822 116 83883	470Ω	5%	0,16W
3888	4822 050 21003	10kΩ	2%	0,25W
3889	4822 116 83883	470Ω	5%	0,16W
3890	4822 050 11002	1kΩ	5%	0,2W
3891	4822 050 11002	1kΩ	5%	0,2W
3892	4822 116 83883	470Ω	5%	0,16W
3893	4822 116 83883	470Ω	5%	0,16W
3894	4822 116 52191	33Ω	5%	0,5W
3895	4822 116 52176	10Ω	5%	0,5W
3897	4822 116 52175	100Ω	5%	0,5W
3899	4822 116 52175	100Ω	5%	0,5W

COILS

1810	4822 242 10849	CRYSTAL 8,46MHz

DIODES

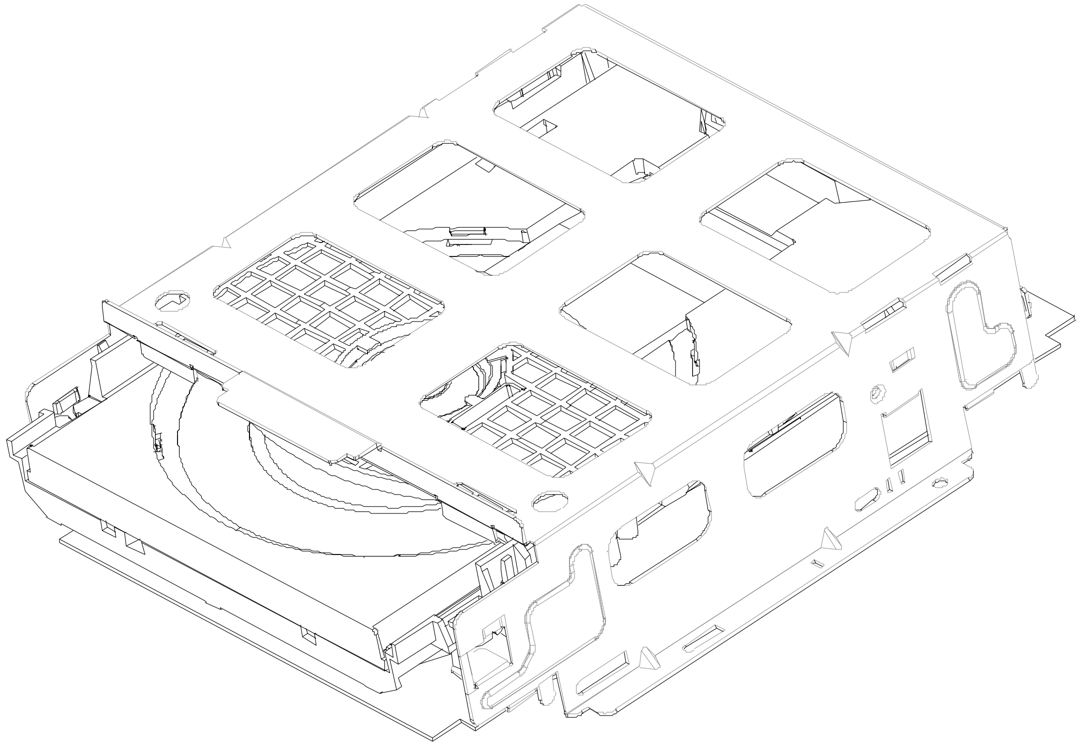
6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	3198 010 55180	DIO REG BZX79-B5V1
6877	3198 010 53980	DIO REG BZX79-B3V9

TRANSISTORS

7812	4822 130 40959	BC547B
7874	4822 130 40959	BC547B
7875	4822 130 40959	BC547B

INTEGRATED CIRCUITS

7801 ©	4822 209 17286	TZA1024T/N1 HF-AMPLIFIER
7806	9352 628 49112	IC TDA7073A/N4
7807	9352 628 49112	IC TDA7073A/N4
7810 ©	8203 303 11278	D/A CONVERTER PCM1716
7871	9352 628 49112	IC TDA7073A/N4
7873	5322 209 10421	HEF4094BP
7876 ©	4822 209 16143	LC89170M
7877 ©	9352 641 80557	SAA7324H/M2B CD10/M2B
7878	4822 209 72042	MC78L05ACP



CDR99 Module

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Blockdiagram...11-2

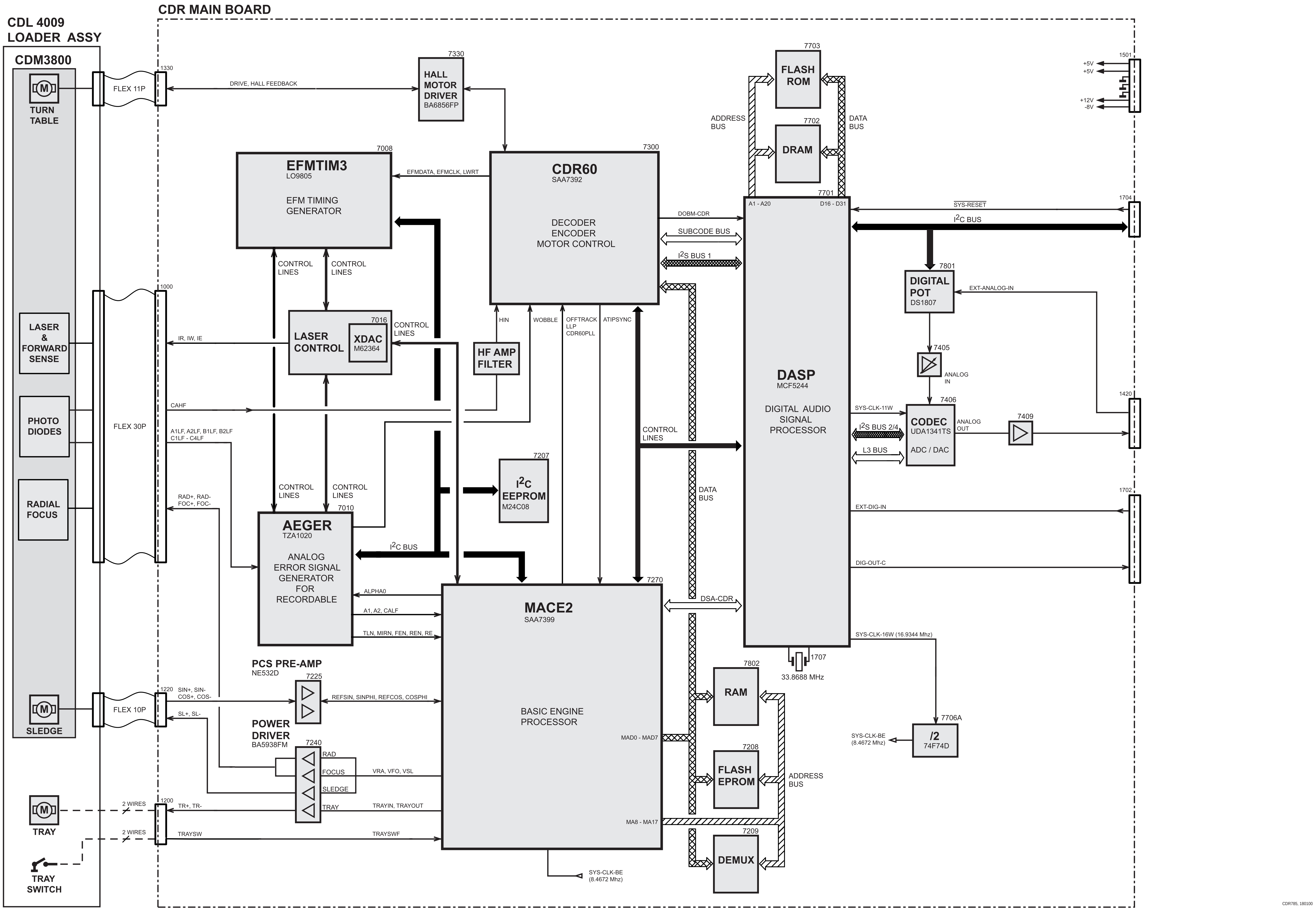
SERVICING HINT

The **CD-R/W module** will be **exchanged completely** in case of a failure. For checking the CD R/W module use the Service Testprogram (chapter 3-4).

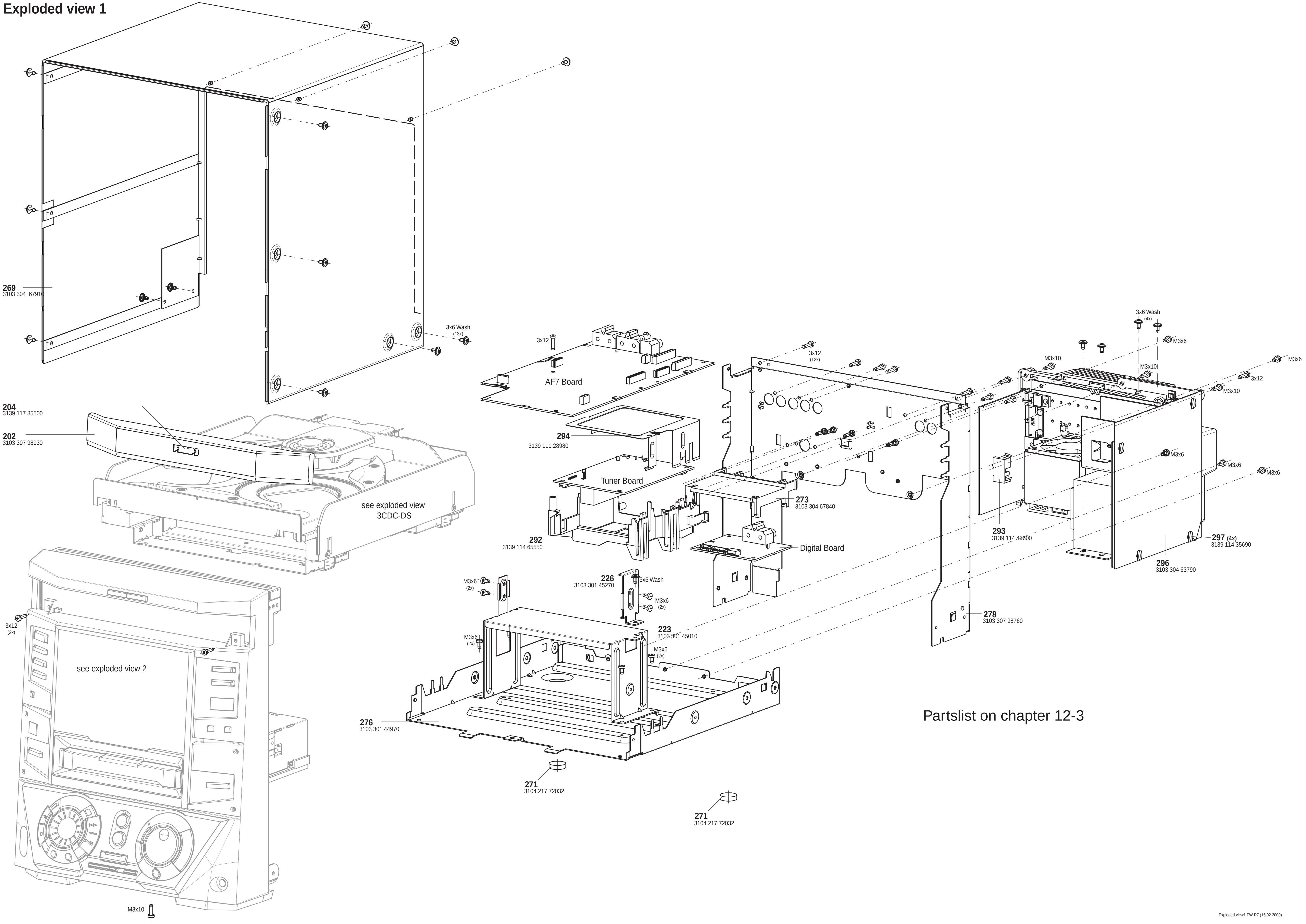
The defective CD-R/W module has to be returned for central repair. Service Code for new Module = **3104129 52590**

Available circuit descriptions:	*The Basics of Compact Disc Recordable/Rewritable*	**4822 725 25242**
	3rd generation Compact Disc Recording	**3104 125 40100**

BLOCK DIAGRAM CDR-MODULE

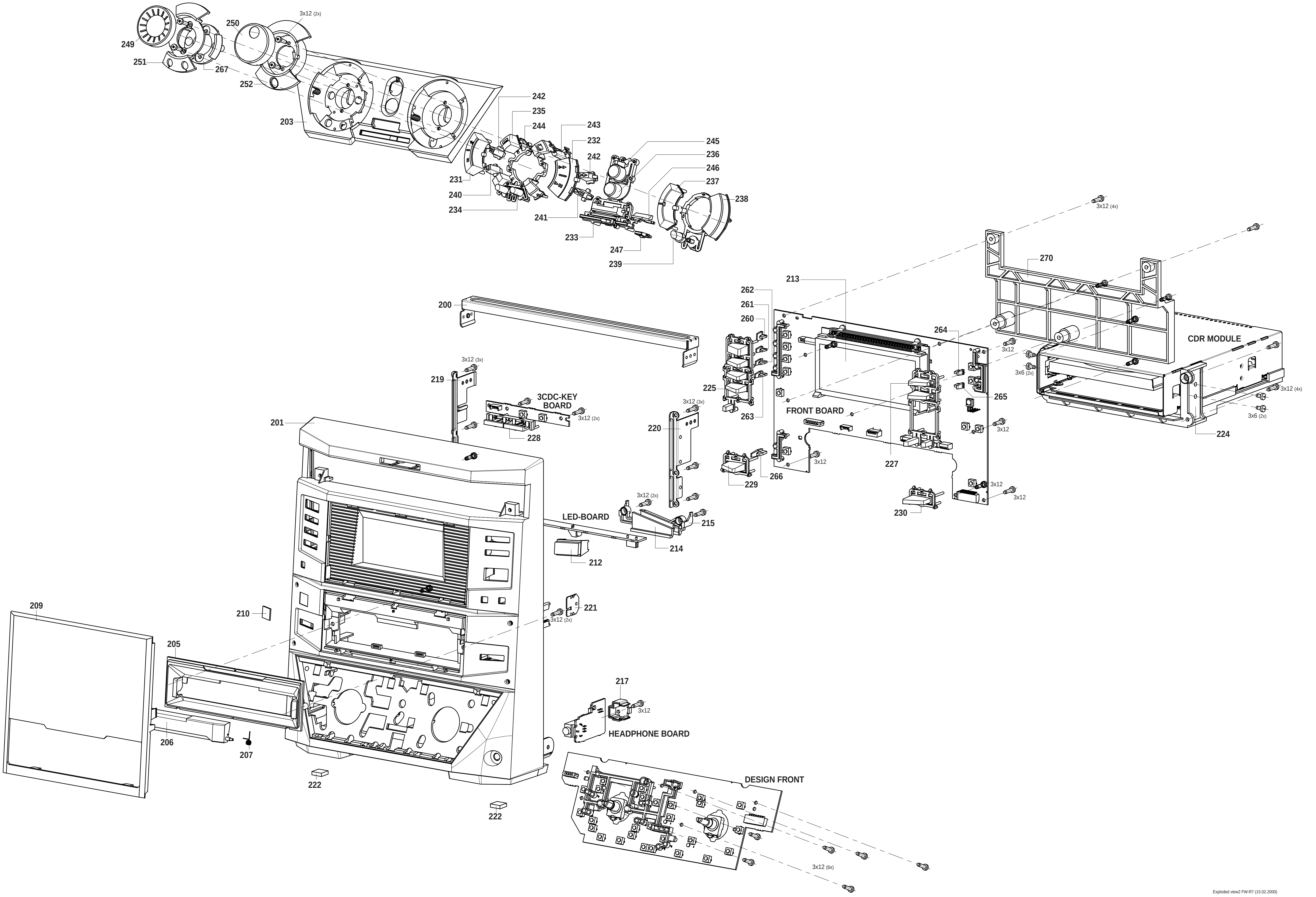

CDR MAIN BOARD
CDL 4009
LOADER ASSY
CDM3800
TURN TABLE
LASER & FORWARD SENSE
PHOTO DIODES
RADIAL FOCUS
SLEDGE
TRAY
TRAY SWITCH
FLEX 11P
FLEX 30P
FLEX 10P
2 WIRES
2 WIRES
1330
1000
1220
1200
DRIVE, HALL FEEDBACK
7330
HALL MOTOR DRIVER
BA6856FP
7008
EFMTIM3
LO9805
EFM TIMING GENERATOR
EFMDATA, EFMCLK, LWRT
7300
CDR60
SAA7392
DECODER ENCODER MOTOR CONTROL
CONTROL LINES
CONTROL LINES
7016
LASER CONTROL
XDAC
M62364
CONTROL LINES
IR, IW, IE
HF AMP FILTER
HIN
WOBBLE
OFFTRACK LLP CDR60PLL
ATIPSYNC
CAHF
A1LF, A2LF, B1LF, B2LF C1LF - C4LF
RAD+, RAD- FOC+, FOC-
CONTROL LINES
CONTROL LINES
7207
I²C EEPROM
M24C08
7010
AEGER
TZA1020
ANALOG ERROR SIGNAL GENERATOR FOR RECORDABLE
I²C BUS
ALPHA0
A1, A2, CALF
TLN, MIRN, FEN, REN, RE
7270
MACE2
SAA7399
BASIC ENGINE PROCESSOR
PCS PRE-AMP
NE532D
7225
SIN+, SIN- COS+, COS-
REFSIN, SINPHI, REFCOS, COSPHI
SL+, SL-
POWER DRIVER
BA5938FM
7240
RAD
FOCUS
SLEDGE
TRAY
VRA, VFO, VSL
TR+, TR-
TRAYIN, TRAYOUT
TRAYSW
TRAYSWF
SYS-CLK-BE (8.4672 Mhz)
MAD0 - MAD7
MA8 - MA17
CONTROL LINES
DATA BUS
DSA-CDR
DOBM-CDR
SUBCODE BUS
I²S BUS 1
7703
FLASH ROM
7702
DRAM
ADDRESS BUS
DATA BUS
7701
A1 - A20
D16 - D31
DASP
MCF5244
DIGITAL AUDIO SIGNAL PROCESSOR
1707
33.8688 MHz
7802
RAM
7208
FLASH EPROM
7209
DEMUX
ADDRESS BUS
1501
+5V
+5V
+12V
-8V
1704
SYS-RESET
I²C BUS
7801
DIGITAL POT
DS1807
EXT-ANALOG-IN
7405
ANALOG IN
1420
7406
SYS-CLK-11W
I²S BUS 2/4
L3 BUS
CODEC
UDA1341TS
ADC / DAC
ANALOG OUT
7409
1702
EXT-DIG-IN
DIG-OUT-C
SYS-CLK-16W (16.9344 Mhz)
7706A
/2
74F74D
SYS-CLK-BE (8.4672 Mhz)
CDR785, 180100

Exploded view 1


269
3103 304 67910
204
3139 117 85500
202
3103 307 98930
3x6 Wash
(13x)
see exploded view
3CDC-DS
3x12
(2x)
see exploded view 2
M3x10
3x12
AF7 Board
294
3139 111 28980
Tuner Board
292
3139 114 65550
M3x6
(2x)
226
3103 301 45270
3x6 Wash
M3x6
(2x)
223
3103 301 45010
M3x6
(2x)
M3x6
(2x)
276
3103 301 44970
271
3104 217 72032
271
3104 217 72032
3x12
(12x)
273
3103 304 67840
Digital Board
278
3103 307 98760
3x6 Wash
(4x)
M3x6
M3x10
M3x10
M3x6
3x12
M3x10
M3x6
M3x6
M3x6
293
3139 114 49600
297 (4x)
3139 114 35690
296
3103 304 63790

Partslist on chapter 12-3

Exploded view 2


3x12 (2x)
250
249
251
267
252
203
242
235
244
243
232
242
245
236
246
237
238
231
240
234
241
233
247
239
3x12 (4x)
270
213
262
261
260
264
3x12
CDR MODULE
3x6 (2x)
200
3x12 (3x)
219
3CDC-KEY
BOARD
3x12 (2x)
201
228
3x12 (3x)
220
225
263
FRONT BOARD
265
3x12 (4x)
3x6 (2x)
3x12
224
3x12
227
266
229
3x12
3x12
230
3x12 (2x)
LED-BOARD
215
214
212
209
210
221
3x12 (2x)
205
217
3x12
HEADPHONE BOARD
206
207
222
222
DESIGN FRONT
3x12 (6x)

MECHANICAL PARTS

201	3103 307 98591	CABINET FRONT
202	3103 307 98931	COVER 3CDC TRAY
203	3103 307 98581	CABINET INSERT
204	4822 454 13408	WORDMARK PHILIPS
205	3103 307 98921	FRAME ORNAMENTAL
206	3103 304 69271	DOOR CDRM99
207	3103 301 06490	SPRING DOOR CDR
209	3103 307 98602	WINDOW DISPLAY/CDR
210	4822 454 13339	ORNAMENTAL PLATE
212	3103 304 68130	LENS IR
213	3103 304 68990	CUTSHEET FTD
214	3103 304 67810	LIGHT GUIDE CDR
215	3103 304 68120	HOLDER LIGHT GUIDE
222	4822 462 40683	FOOT RUBBER
225	3103 307 98941	BUTTON-SET POWER
226	3103 301 45270	BRACKET CDR RIGHT
227	3103 307 99031	BUTTON-SET AUX/TUNER
228	3103 307 98951	BUTTON-SET 3CDC-OPEN
229	3103 307 98961	BUTTON-CDR SELECT
230	3103 307 98971	BUTTON-CDR OPEN
231	3103 307 98611	BUTTON-STOP PREV
232	3103 307 98621	BUTTON-PLAY NEXT
233	3103 307 98642	BUTTON-SET REC-TYPE
234	3103 307 98631	BUTTON-SET TRACK-MENUE
235	3103 304 68711	BUTTON-SET YES-NO-REC-PROG
236	3103 307 98652	BUTTON-SET CD-REC
237	3103 307 98662	BUTTON-PURE LOUDNESS
238	3103 307 98671	BUTTON-SET DSC-IS
239	3103 304 68970	CAP INCREDIBLE SURROUND
240	3103 304 68750	LIGHTGUIDE STOP
241	3103 304 68760	LIGHTGUIDE PLAY
242	3103 304 68770	LIGHTGUIDE PREV-NEXT
243	3103 307 98681	LIGHT GUIDE YES
244	3103 307 98691	LIGHT GUIDE NO
245	3103 304 68800	LIGHTGUIDE CD-REC
246	3103 304 68810	LIGHTGUIDE REC-TYPE
247	3103 304 68820	LIGHTGUIDE FINALIZE
249	3103 307 98701	ROTARY JOG
250	3103 307 98711	ROTARY VOLUME
251	3103 307 98721	COVER JOG
252	3103 307 98731	COVER VOLUME
260	3103 304 67360	LIGHT GUIDE POWER
261	3103 304 67370	LIGHT GUIDE CD1
262	3103 304 67380	LIGHT GUIDE CD2
263	3103 304 67390	LIGHT GUIDE CD3
264	3103 304 67870	LIGHT GUIDE AUX
265	3103 304 67880	LIGHT GUIDE TUNER
266	3103 304 67930	LIGHT GUIDE CDR
267	3103 304 68830	LIGHT GUIDE JOG-ROTARY
271	4822 462 40683	FOOT RUBBER
293	4822 402 10288	BRACKET MAINS SOCKET
297	4822 466 93148	SPACER

MISCELLANEOUS

	3103 307 99140	SPEAKER-BOX LEFT
	3103 307 99150	SPEAKER-BOX RIGHT
	4822 303 50063	FM AERIAL
	4822 320 11094	FW ANTENNA WIRE /37
	4822 303 50082	AM FRAME AERIAL
	3139 228 83630	REMOTE CONTROL RC2505/01
	3104 128 92560	MAINS CORD, UL
	4622 004 50290	CORDSET
1008	3103 308 30540	TRANSFORMER MAINS FOR /37
1008	3103 308 30550	TRANSFORMER MAINS FOR /22
1008	3103 308 30560	TRANSFORMER MAINS FOR /21
8002	4822 320 12335	FLEX FOIL CABLE,17P, 125mm
8004	3103 308 92310	FLEX FOIL CABLE 6P, 400mm
8006	3103 308 92320	FLEXFOIL CABLE, 7P, 280mm
8009	3103 308 92330	FLEX FOIL CABLE, 5P, 280mm
8013	3103 308 92340	FLEX FOIL CABLE, 5P, 280mm
8014	3103 308 92470	FLEX FOIL CABLE, 19p, 400mm
8015	3103 308 92460	FLEX FOIL CABLE 4P, 400mm

REPLACEMENTS

	3104129 52590	CD-R/W MODULE